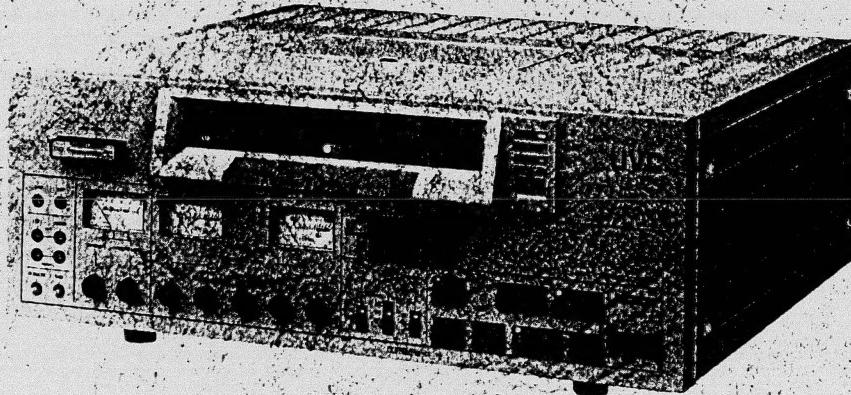


JVC SERVICE MANUAL

BR-7000ERA



SPECIFICATIONS

VHS Hi-Fi

GENERAL

Format	: VHS 1/2" PAL Standard
Power requirement	: 220/240 V~, 50/60 Hz
Power consumption	: 43 watts (Max. 55 watts with remote control unit, 12 V ---, 550 mA)
Dimensions	: 440(W) x 174(H) x 448(D) mm
Weight	: 17.5 kg
Operating temperature	: 5°C to 40°C
Tape speed	: 23.39 mm/sec.
Recording time	: Max 240 min. with E-240 cassette
FF/REW time	: Less than 4.0 min. for E-180 cassette
VIDEO	
Video signal system	: PAL colour and CCIR monochrome signals, 625 Lines
Input	: 0.5 to 2.0 Vp-p, 75 ohms, Unbalanced
Output	: 1.0 Vp-p, 75 ohms, Unbalanced
Signal-to-noise ratio	: 45 dB (B/W) (Rohde and Schwarz)
Horizontal resolution	: 250 Lines (Colour)

AUDIO

Input	: -6 dBs, 10 k-ohms, unbalanced (Normal)
Output	: -6 dBs, into 1 k-ohm, unbalanced (Normal, Hi-Fi)
Frequency response	: 20 Hz to 12 kHz (Normal) 20 Hz to 20 kHz (Hi-Fi)
Dynamic range	: 87 dB (Hi-Fi)
Signal-to-noise ratio	: 46 dB (NR-on), 42 dB (NR-off) (Normal) at 3 % distortion
Wow and flutter	: Less than 0.005 % wrms (Hi-Fi)
CONNECTORS	
Video input/output	: BNC-type
Audio input	: XLR (Hi-Fi) RCA (Normal)
Audio output	: RCA (Hi-Fi, Normal)
Remote control	: 34-pin connector
AC IN	: 3-Wired AC connector
Accessories	: Hour meter x 1

Design and specifications subject to change without notice.

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

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● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the symbol and shaded (■) parts are critical for safety.

Replace only with specified part numbers.

Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.

Caution for continued protection against fire hazard.
Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:

- 1) Wires covered with PVC tubing
- 2) Double insulated wires
- 3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:

- | | | |
|--------------------|--------------------------------------|------------|
| 1) Insulation Tape | 3) Spacers | 5) Barrier |
| 2) PVC tubing | 4) Insulation sheets for transistors | |

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

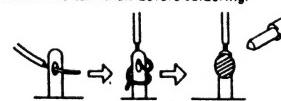


Fig. 1

7. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

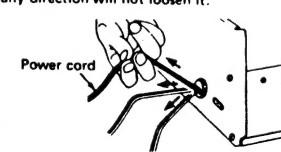


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)

In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

1) Connector part number : E03830-001

2) Required tool : Connector crimping tool of the proper type which will not damage insulated parts.

3) Replacement procedure

- (1) Remove the old connector by cutting the wires at a point close to the connector.
- Important : Do not reuse a connector (discard it).



Cut close to connector

Fig. 3

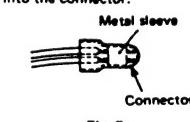
(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.



15 mm

Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

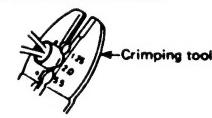


Metal sleeve

Connector

Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.



Crimping tool

Fig. 6

(5) Check the four points noted in Fig. 7.

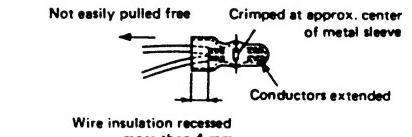


Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

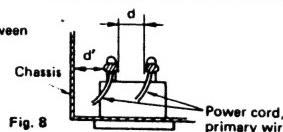
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

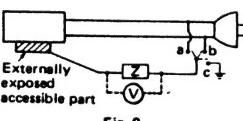


4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

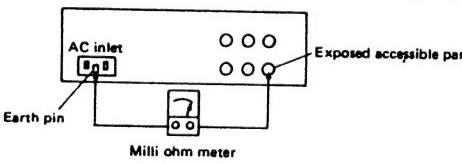


5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio In, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.



Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	$Z \leq 0.1 \text{ ohm}$
Europe & Australia	$Z \leq 0.5 \text{ ohm}$

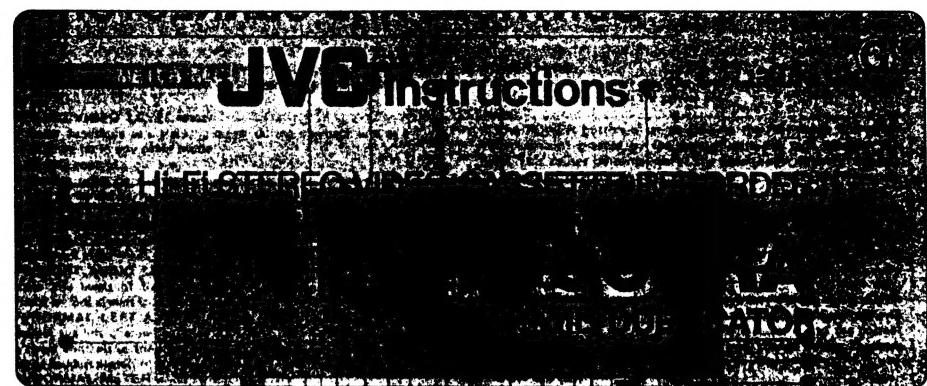
AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V				
100 to 240 V	Japan	$R \geq 1 \text{ M}\Omega /500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3 \text{ mm}$
110 to 130 V	USA & Canada	—	AC 1.5 kV 1 minute	$d, d' \geq 4 \text{ mm}$
110 to 130 V	Europe & Australia	$R \geq 10 \text{ M}\Omega /500 \text{ V DC}$	AC 900 V 1 minute	$d, d' \geq 3.2 \text{ mm}$
200 to 240 V			AC 3 kV 1 minute (Class II)	$d \geq 4 \text{ mm}$
			AC 1.5 kV 1 minute (Class I)	$d \geq 8 \text{ mm} (\text{Power cord})$ $d \geq 6 \text{ mm} (\text{Primary wire})$

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	$0 - \text{---} - 0$ 1 k Ω	$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada	$0.15 \mu\text{F} - \text{---} - 0$ 1.5 k Ω	$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	Europe & Australia	$0 - \text{---} - 0$ 2 k Ω	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
220 to 240 V		$0 - \text{---} - 0$ 50 k Ω	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.



WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

Warning Notice FOR YOUR SAFETY (Australia)

1. Insert this plug only into effectively earthed three-pin power outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cords, if used, must be three-core correctly wired.

FOR YOUR SAFETY

Install any external aerial to AS 1417.1

WARNING—THIS APPARATUS MUST BE EARTHED IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

GREEN-and-YELLOW:	EARTH
BLUE:	LIVE
BROWN:	NEUTRAL

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol \triangle or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or which is coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

CAUTION

To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

NOTE: The rating plate and the safety caution are on the rear of the unit.

POWER SYSTEM

Connection to the mains supply

The operating voltage of this set is preset to 240 V~ at the factory.

Before connecting to mains, check that the voltage selector on the rear panel is set to the same voltage as your local mains supply.

Adapting to local power line

This set operates on either 220 or 240 V~.

If the preset voltage is different from the power line voltage in your area, reset the voltage selector by inserting a screwdriver into the slot of the voltage selector and turning it until the correct voltage is displayed.

FEATURES

A New Hi-Fi VHS recorder designed exclusively for tape duplication with the following features:

Space-saving, front-loading and rack-mountable VHS recorder.

Heavy-duty mechanism

- Aluminium diecast chassis
- Head drum, capstan and reel servos with independent direct-drive motors to assure stable recording and playback.

Top quality Hi-Fi sound

- Independent rotary FM-audio heads
- Frequency response 20 Hz to 20 kHz
- Dynamic range 87 dB
- Harmonic distortion less than 0.7 %
- Wow and flutter less than 0.005 % (WRMS)
- Channel separation more than 60 dB

Duplicator-friendly operation

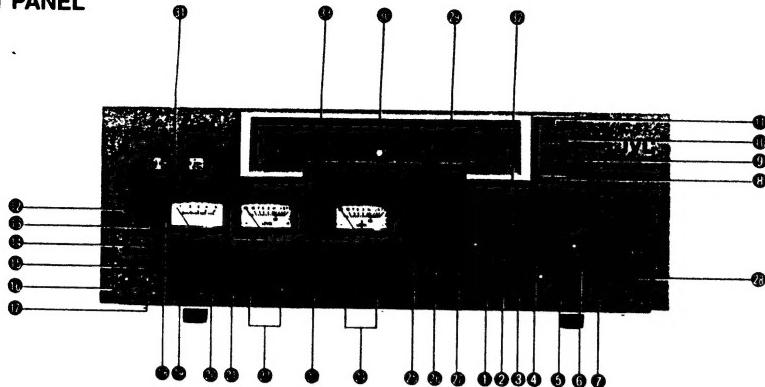
- Wide opening with a guide for easy loading and unloading of cassette.
- Large recording indicator for quick, at-a-glance checking.
- Recording capability of cassette with its recording safety tab removed.
- Large video/tracking and audio meters
- Cover for operational control buttons to avoid accidental misoperation.
- Video AGC on/off switch

Easy maintenance and serviceability

- Door for tape path cleaning
- Hour meter (2000H) indicating drum running time
- Test points on the front panel

CONTROLS AND CONNECTORS

FRONT PANEL



BASIC FUNCTION BUTTONS

- **EJECT button**
Press to eject the cassette. This button can be pressed in any mode. The EJECT LED will flash during automatic unloading of the cassette and then be extinguished upon completion of ejection.

Record button (REC)

1. Pressing the REC and PLAY buttons simultaneously during playback engages the Record mode immediately and both REC LEDs light. (The PLAY LED also remains lit.)
2. Pressing the REC and PLAY buttons simultaneously during FF or REW engages the Stop mode first, then starts tape loading, after which recording begins.
3. Pressing the REC and PLAY buttons simultaneously in the Stop mode starts tape loading immediately, after which recording begins.
4. In cases 2 and 3 above, both REC LEDs light continuously and the PLAY LED blinks during tape loading and remains lit together with the two REC LEDs when recording begins.

5. If, during PLAY, the REC button is pressed, the E-E mode is entered for both video and audio, while the REC button is being held pressed.

The picture may be distorted at switching points from PLAY to E-E or from E-E to PLAY. This is normal.

Rewind button (REW)

1. Pressing the REW button in the Stop or Fast Forward mode engages the Rewind mode immediately, the REW LED lights.
2. Pressing the REW button in the Play, Pause, Record or Record Pause mode has no effect. (The current mode remains engaged.)
3. When the REW button is pressed during tape unloading (the STOP or EJECT button has been pressed in the Play or Record mode and the STOP or EJECT LED is blinking), the REW LED starts blinking and the STOP or EJECT LED is extinguished. The Rewind mode engages automatically, immediately after completion of tape unloading, with the REW LED remaining lit.

STOP button

1. Pressing the STOP button during playback or recording starts tape unloading and engages the STOP mode.
2. Pressing the STOP button in the Fast Forward or Rewind mode, likewise, engages the Stop mode immediately.
3. During tape unloading the STOP LED blinks; upon completion of unloading, the STOP LED remains lit.

PLAY button

1. Pressing the PLAY button in the Stop mode starts tape loading immediately for playback.
2. Pressing the PLAY button in the Fast Forward or Rewind mode causes the Stop mode to be entered first, then tape loading starts for playback.
3. The PLAY LED blinks during tape loading, and remains lit upon completion of loading.

INDICATOR SECTION

REC indicator

Lights when the Hi-Fi audio signals are being recorded, with the Hi-Fi REC select switch set to ON or REMOTE.

WARNING indicator

This LED lights when the tape is not running properly or condensation occurs inside the unit.

Noise reduction (NR) indicator

Lights when the noise reduction switch (NR) is set to ON.

TEST POINTS

Hi-Fi audio head output signal test point (A-RF)

The Hi-Fi audio signal is output in the form of an FM signal during playback, allowing clogged or worn heads to be detected.

Video head output signal test point (V-RF)

The video head signal is output in the form of an FM signal during playback, allowing clogged or worn heads to be detected.

Hi-Fi audio output signal test points (LEFT and RIGHT)

To check the signals output from the rear panel Hi-Fi AUDIO OUT connectors.

NORMAL audio output signal test points (LEFT and RIGHT)

To check the signals output from the rear panel NORMAL AUDIO OUT connectors.

D-PULSE pin

Connect to the external trigger terminal of an oscilloscope.

GND pin

Connect to the ground terminal of an oscilloscope.

METER SECTION

TRACKING/VIDEO LEVEL meter

This meter functions as a tracking meter during playback and as a video level meter in any other mode.

TRACKING control

To minimise noise bars during playback, turn this control so that the meter makes its maximum deflection.

VIDEO LEVEL control

To adjust the video signal level manually, set the VIDEO AGC switch to OFF and turn this control so that the meter deflects into the green area.

LEFT/RIGHT AUDIO LEVEL meters

Indicate the levels of the audio signals (playback signals during playback or E-E signals in any other mode).

Hi-Fi/NORMAL LEFT AUDIO REC LEVEL controls

To adjust the left channel Hi-Fi or NORMAL audio recording level, turn these controls so their corresponding meter deflects to '0' with the loudest signal.

Hi-Fi/NORMAL METER select switch

Hi-Fi/NORMAL RIGHT AUDIO REC LEVEL controls

To adjust the right channel Hi-Fi or NORMAL audio recording level, turn these controls so their corresponding meter deflects to '0' with the loudest signal.

VIDEO AGC switch

Set to ON to activate the built-in video AGC circuit.

Hi-Fi REC select switch

- | | |
|------|--|
| ON: | Set to this position to record the Hi-Fi audio signals. |
| OFF: | Set to this position when recording of the Hi-Fi audio signals is not desired. (Also FM carrier signal will be cut off.) |

REMOTE

Set to this position to remote-control above function via the serial code remote control.

NORMAL AUDIO noise reduction switch (NR)

Set to ON to activate the built-in Dolby® noise reduction system to reduce tape hiss.

POWER button

Press to turn the power on. The level meters will be illuminated. Pressing again will switch the power off.

Note:

If the POWER button is set to OFF in the Play mode, the pinch roller remains pressed by the capstan with the tape between the two. This causes deformation of the pinch roller rubber, resulting in irregular tape movement. Therefore, set the POWER button to OFF only after confirming that the unit is in the Stop mode. (During actual tape unloading, while the STOP LED is blinking, do not press the POWER button.)

Tape COUNTER and COUNTER RESET button

This counter indicates the relative position on the tape. Pressing the COUNTER RESET button sets the counter to 0000.

Cassette loading slot

With the POWER button pressed to on, insert a video cassette with its labelled edge facing toward you. The cassette carriage itself will automatically take control and retract the cassette into the correct loaded position. The lower door flap will change colour to show that a cassette is loaded.

HOUR METER

This indicates the total operating time. After 2000 hours of operation, the red line moves to the right end of the scale. (Attach the meter securely before use.)

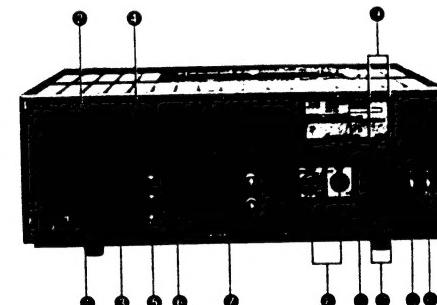
Guard cover mounting hole

Tape path maintenance door

For access to the tape path for cleaning, use a screwdriver to remove this cover.

* Dolby noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

* Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.



REAR PANEL

AC input socket (AC IN)

Connect to a 220 or 240 V~ 50/60 Hz power outlet.

VOLTAGE SELECTOR

Using a screwdriver, turn until the correct voltage (220 or 240 V) is displayed.

FUSE holder

SERIAL CODE IN/OUT connectors

Ground terminal

REMOTE control connector (34-pin)

VIDEO IN/OUT connectors

Hi-Fi AUDIO IN connectors (LEFT and RIGHT)

NORMAL AUDIO IN connectors (LEFT and RIGHT)

Hi-Fi AUDIO OUT connectors (LEFT and RIGHT)

Deliver signals of the Hi-Fi audio track.

NORMAL AUDIO OUT connectors (LEFT and RIGHT)

Deliver signals of the longitudinal audio track.

FULL REPEAT switch

- | | |
|------|---|
| ON: | Set to this position to repeatedly play back the pre-recorded tape in its entirety. |
| OFF: | Set to this position when the repeat function is not desired. |

AUDIO INPUT SELECT switch

- | | |
|--------|---|
| H COM: | Set to this position to record the audio signals being input to the Hi-Fi AUDIO IN connectors onto both the Hi-Fi and longitudinal audio tracks - a "Hi-Fi Combined" recording. |
| N COM: | Set to this position to record signals being input to the NORMAL AUDIO IN connectors onto both the Hi-Fi and longitudinal audio tracks - a "Normal Combined" recording. |

SEP: Set to this position to record the signals being input to the Hi-Fi AUDIO IN connectors onto the Hi-Fi audio track, and to the NORMAL AUDIO IN connectors onto the longitudinal audio track - a "Separate" recording.

N COM: Set to this position to record signals being input to the NORMAL AUDIO IN connectors onto both the Hi-Fi and longitudinal audio tracks - a "Normal Combined" recording.

TEST POINTS

The output signals from the Hi-Fi audio heads, video heads, Hi-Fi audio track and normal audio track are available at the front panel test points. Connect an oscilloscope to these test points to check the performance and condition of the unit.

Connection	Items to be checked	Standard waveform
Hi-Fi audio head output 	• Tape-to-head contact • Tape running stability • Inferior RF after head replacement	• "+" triggered
Video head output 	• Compatibility of tape pattern • Tape-to-head contact • Tape running stability • Tracking • Video signal recording level • Abnormality in RF	• "+" triggered
Hi-Fi audio output 	• Quality of recording and playback	• Approx. -6 dBs output at reference input level • Output impedance: less than 5 k-ohms
Normal audio output 	• Quality of recording and playback • Tape-to-head contact, dirty head (fluctuation of audio level) • Alignment of audio/control head	• Approx. -6 dBs output at reference input level • Output impedance: less than 5 k-ohms

SPECIFICATIONS

GENERAL

Format	: VHS 1/2" PAL Standard
Power requirement	: 220/240 V~, 50/60 Hz
Power consumption	: 43 watts (Max. 55 watts with remote control unit, 12 V ---, 550 mA)
Dimensions	: 440(W) x 174(H) x 448(D) mm
Weight	: 17.5 kg
Operating temperature	: 5°C to 40°C
Tape speed	: 23.98 mm/sec.
Recording time	: Max 240 min. with E-240 cassette
FF/REW time	: Less than 4.0 min. for E-180 cassette
VIDEO	
Video signal system	: PAL colour and CCIR monochrome signals, 625 Lines
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 45 dB (B/W) (Rohde and Schwarz)
Horizontal resolution	: 250 Lines (Colour)

AUDIO

Input	: -6 dBs, 10 k-ohms, unbalanced (Normal)
Output	: -6 dBs, 10 k-ohms, balanced (Hi-Fi)
	: -6 dBs, into 1 k-ohm, unbalanced (Normal, Hi-Fi)
Frequency response	: 20 Hz to 12 kHz (Normal)
	: 20 Hz to 20 kHz (Hi-Fi)
Dynamic range	: 87 dB (Hi-Fi)
Signal-to-noise ratio	: 46 dB (NR-on), 42 dB (NR-off) (Normal) at 3% distortion
Wow and flutter	: Less than 0.005% wrms (Hi-Fi)
CONNECTORS	
Video input/output	: BNC-type
Audio input	: XLR (Hi-Fi)
	: RCA (Normal)
Audio output	: RCA (Hi-Fi, Normal)
Remote control	: 34-pin connector
AC IN	: 3-Wired AC connector
Accessories	: Hour meter x 1

Design and specifications subject to change without notice.

SECTION 1 GENERAL DESCRIPTION

1.1 DISASSEMBLY

Improvements of the BR-7000BRA over the BR-7000BR. The performance of the BR-7000ERA Hi-Fi Duplicator is improved over that of the BR-7000ER in the following points:

1. Improved Hi-Fi audio performance

- 1) Expanded dynamic range (from 82 dB to 87 dB)
- 2) Reduced switching noise, for cleaner sound recording and playback
- 3) Enhanced reliability through the more intensive use of ICs and automated insertion of circuit components
- 4) Improved control linearity of the Hi-Fi REC LEVEL controls on the front panel (improved from curve A to curve B)

2. Improved drum/capstan circuits

- The three circuit boards forming the drum and capstan servo circuits and the drum MDA circuit have been integrated into one circuit board through the more intensive use of ICs, and the number of points to be adjusted has been reduced from 12 to two, thus greatly improving reliability.

3. Alteration of the mother board

- The mother board has been changed to accommodate the single circuit board made possible by the integration of the drum/capstan servo circuits and the drum MDA circuit.

4. Mechanical changes

- 1) The capstan motor has been changed.
- 2) The drum assembly has been changed while retaining the same video heads as the BR-7000ER, for improved linearity and tape interchangeability.
- 3) The sub-deck has also been changed to accommodate the new drum assembly.
- 4) The reel motor has been changed to obtain higher torque.
- 5) Head clogging has been eliminated by the addition of a video head cleaning mechanism, thus enhancing reliability.
- 6) The dew sensor has been changed to accommodate the new sub-deck.
- 7) The drum head relay circuit board has been changed to accommodate the new sub-deck.

1.2 EXTERNAL COVERS

• Top cover

1. Take out two screws and remove the top cover in the rearward direction.

• Front panel

1. Remove the top cover.
2. Take out five screws and remove the front cover.

• Bottom cover

1. Take out six screws and remove the bottom cover.

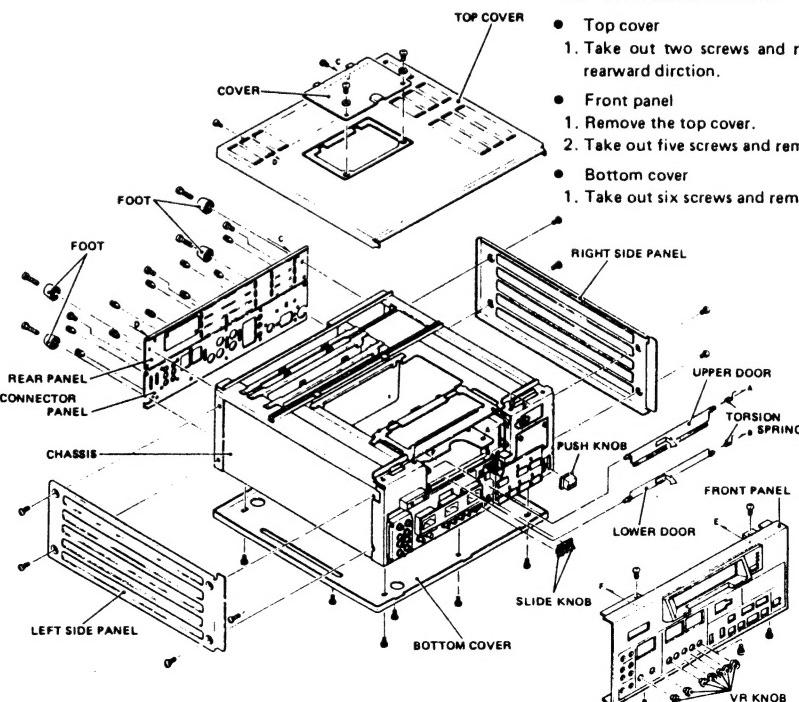


Fig. 1-1 External covers

- Rear panel
 1. Remove the top cover and feet.
 2. Take out three screws and remove the rear panel.
- Connector panel
 1. Take out ten plastic rivets and remove the connector panel.
- Upper door and Lower door
 1. Remove the front panel.
 2. Move the lower door in the arrow direction to remove it. Use care regarding the torsion spring.
 3. In the same manner, move the upper door in the arrow direction to remove it. Use care regarding the torsion spring.

1.3 CIRCUIT BOARD ASSEMBLIES

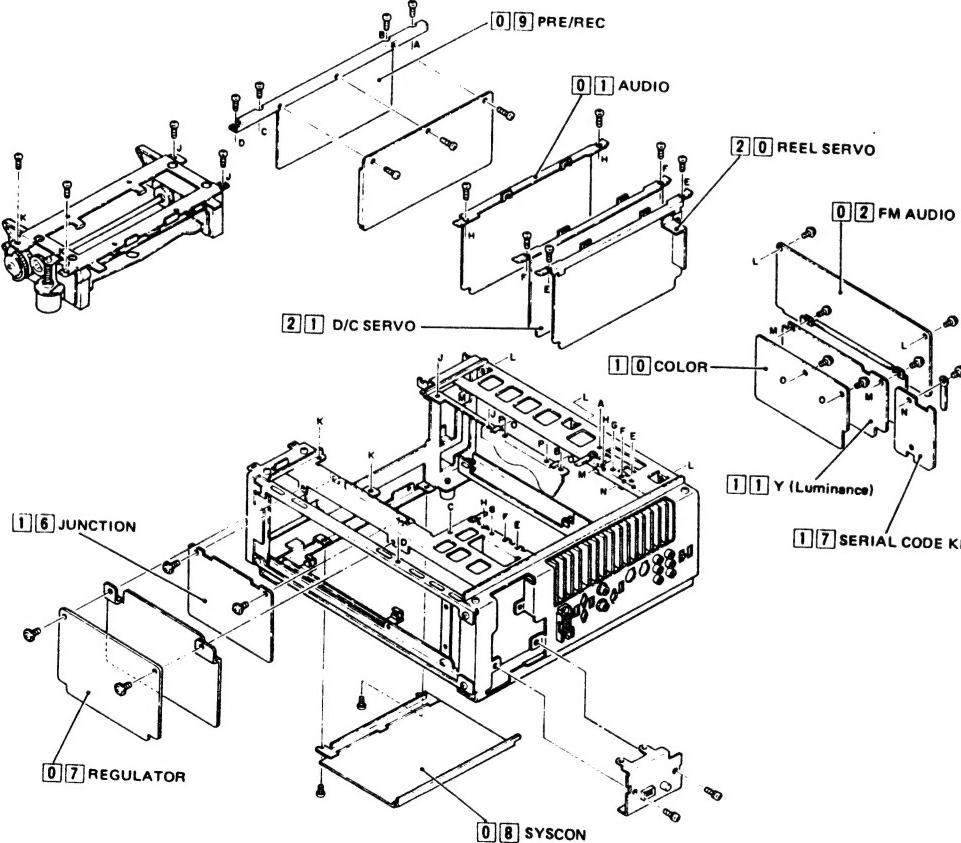


Fig. 1-2 External covers

- When reassemble the doors, perform the following:
 - 1) Observe the upper door and recognize the mark on the gear portion.
 - 2) Set the long straight part of the torsion spring toward the upper door.
 - 3) Install the upper door in the state with the mark corresponding with the mark of the upper door opener on the cassette housing.
- Right and Left side panel
 1. Each side panel can be removed by taking out four screws.

SECTION 2 MECHANICAL ADJUSTMENT

2.1 FOREWORD

Mechanism adjustments described in this section are only those considered necessary for field services, and some kind of adjustments requiring highly precise equipment and technique are excluded. Periodical checkup and maintenance are very important to keep the machine with the original performance as well as to prevent tapes from damage. Adjustments which require specified tools and jigs must be performed with them.

2.2 REQUIRED JIGS AND EQUIPMENT

For proper and complete adjustments the following jigs and equipment are necessary.

If adjustments are done without those jigs and tools, it takes a long-time trial and error and it ends with unsatisfactory results in accuracy and performance.

Besides the following, general-purpose tools including hexagonal wrenches (1.5 mm and 2.4 mm) are necessary.

Note: For test equipment and jigs necessary for electrical adjustments, refer to Section 3 "Electrical Adjustment".

Alignment tapes MH-2, MH-F8	Parallel check plate PUJ50204	Height gauge PUJ42147-2	Master plane fixture PUJ42146
Torque gauge PUJ48075-3	TU guide height gauge PUJ44650	A/C head positioning Tool PUJ44653	
Cassette torque meter PUJ42881, PUJ42881-B	Microchecker PUJ49712-2	Thickness gauge PUJ48017	

Fig. 2-1 Jigs and adjusting equipment

2.3 LOCATION OF MAIN PARTS

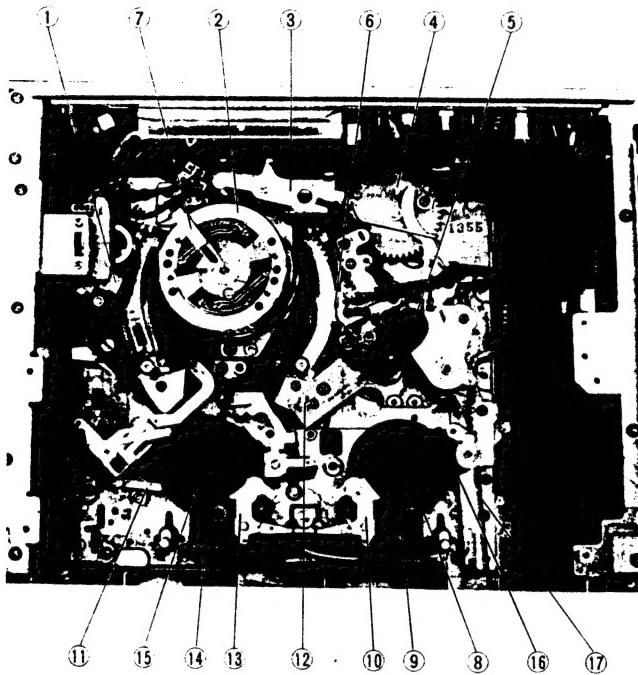


Fig. 2-2 Chassis (Top view)

Ref. No.	Parts No.	Parts Name	Description
1	PU54397	Full Erase Head	
2	PDM2104B	Upper Drum Ass'y	
3	PRD40505	Cleaner Arm Ass'y	
4	PRD400708	Pinch Roller Arm Drive Gear Ass'y	
5	PQ40137A	Pinch Roller Ass'y	
6	PGZ00271	A/C Head Ass'y	
7	PDM4162A	Brush Ass'y	
8	PGZ00896A-01	T.U Reel Disk Ass'y	
9	PU55701	T.U Photo Interrupter	
10	PU50535D	T.U Brake Ass'y	
11	PU51390A	Tension Band Ass'y	
12	GL-450V	Cassette LED	
13	PU50535C	SUP. Brake Ass'y	
14	PU55701	SUP. Photo Interrupter	
15	PGZ00897A-01	SUP. Reel Disk Ass'y	

Table 2-1

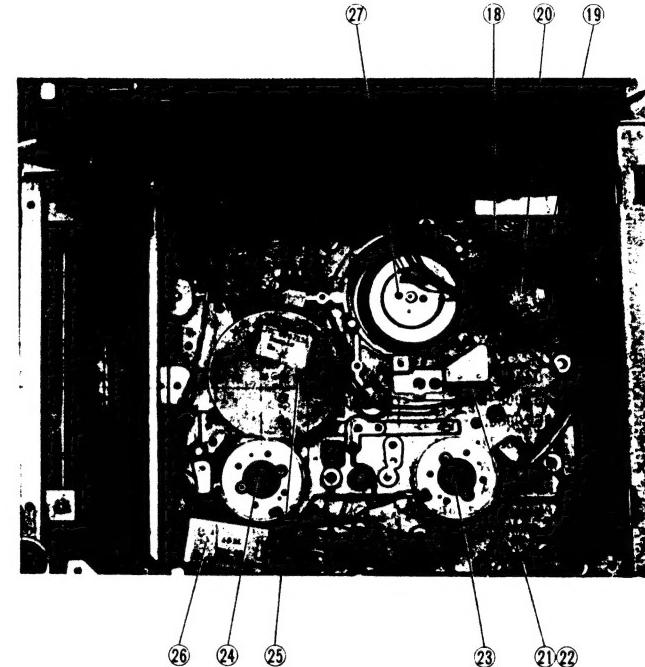


Fig. 2-3 Chassis (Bottom view)

Ref. No.	Parts No.	Parts Name	Description
16	PRD40084-1	Counter Belt	
17	" -2	Counter Belt	
18	PGZ00032A-1	Loading Drive Gear Ass'y	Incl. 17 and 18
19	PU50350	Loading Belt	
20	PU52745A	Loading Motor Ass'y	
21	QSM1S11-211	Switch	
22	" -211	A.L. Switch	
23	PGZ00895	SUP. Reel Motor	
24	"	T.U Reel Motor	
25	PGZ00877	Capstan Motor	
26	PGZ00092	Brake Solenoid	
27	PDM2105B-2	Lower Drum Motor Ass'y	

Table 2-2

2.4 SERVICING SCHEDULE FOR MAIN COMPONENTS

System	Parts Name	Parts No.	Periodic Service Schedule (Operating Hours)										Reference Section
			500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension pole												
	SUP slant pole												
	SUP guide roller												
	SUP guide pin												
	SUP guide pole												
	SUP impedance roller												
	SUP brake												
	Capstan		★	★	★	★	★	★	★	★	★	★	
	TU Brake												
	TU guide roller												
Drive System	TU slant pole												
	TU guide pole												
	Full erase head	PU54397	★	★	★	★	★	★	★	★	★	●	2.5.9
	A/C head ass'y	PGZ00271	★	★	★	●	●	●	●	●	●	●	2.5.2
	Upper drum ass'y	PDM2104B	★	●	●	●	●	●	●	●	●	●	2.5.3
Others	Lower drum motor ass'y	PDM2105B-2	★	★	★	●	●	●	●	●	●	●	2.5.6
	Pinch roller	PQ40137A	★	★	★	●	●	●	●	●	●	●	2.5.5
	SUP reel motor	PGZ00895			●				●				2.5.7
Drive System	TU reel motor	PGZ00895			●				●				2.5.5
	Capstan motor	PGZ00877			●				●				2.5.1
	Cassette housing motor	PQ40090A											2.5.8
	Loading motor	PU52745A											
	Counter Belt	PRD40084-1											
	Counter Belt	PRD40084-2											
	Conuter Belt	PRD40084-3											
	Loading belt	PU50350	★	●	●	★	●	●	●	●	●	●	2.5.2
Others	Brush ass'y	PDM4162A											2.6.7
	Tension band ass'y	PU51390A			●								
	Hour Meter	PGZ00124			●								
Others	Head cleaner	PRD40510-01-02			●								

★ Cleaning ○ Check ● Replacement

Note: • The above schedule is just a reference for machines used in an average condition.

• Life time of the upper drum greatly depends on working conditions.

Table 2-3 Periodical servicing schedule

2.5 MAIN PARTS REPLACEMENT

When replacing parts, remove external cover, circuit boards, shield covers, cassette housing, etc., as required.

2.5.1 Cassette housing and cassette motor

Note: Avoid operating the slide plate within with fingers, etc. when dismounting the cassette housing without using a cassette. Danger is involved when the reinforcement touches the roof plate at the time of cassette loading.

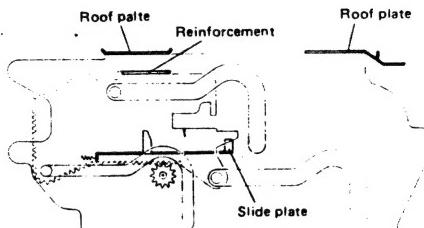


Fig. 2-4 Cassette housing

• Operation preset

This configuration allows operating the mechanism with the cassette housing removed. Perform as follows.

- Place the cassette housing upside down on the rear bracket, as shown in Fig. 2-6. Engage the connectors of the cassette housing with the cassette housing board.
- Insert cassette and perform loading.
- After completion of loading and the sensors are enabled, use the operation switches to select the desired modes.



Fig. 2-6 Mechanism functions

[A] Cassette housing removal

- Disconnect the connector of the cassette housing board.
- Remove the mounting screws of the front panel. Shift the top of the front panel forward to facilitate removing the cassette housing.
- Take out 4 screws ①. Carefully lift the cassette housing upward to remove it.

Note: To operate mechanism after removal of the cassette housing, observe the following steps.

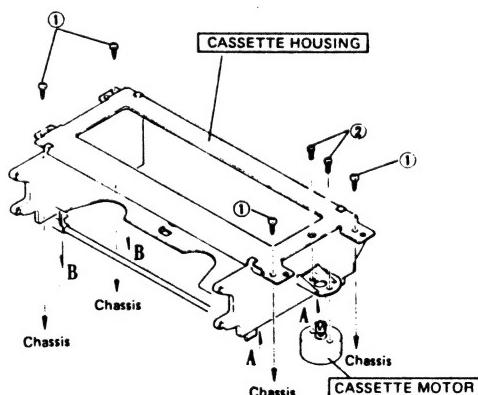


Fig. 2-5 Removint cassette housing

[B] Cassette motor

- Remove the cassette housing. Quickly unsolder the wires of the cassette motor.
- Take out 2 screws ② and replace the cassette motor (see Fig. 2-5).
- Use care regarding motor wire polarity and reassemble by reversing the above steps.

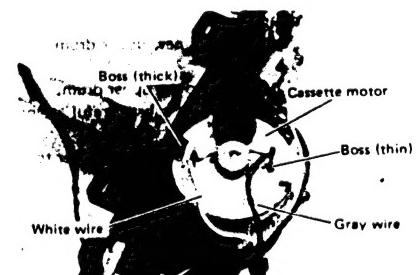


Fig. 2-7 Cassette motor wiring

2.5.2 Upper drum

1. Remove two screws (DPSP3006ZY) fixing the brush ass'y to take it off.

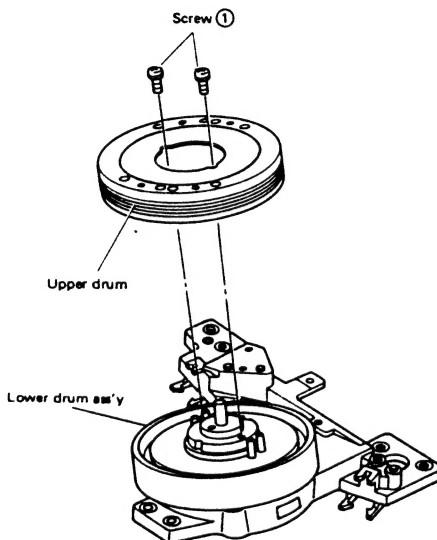


Fig. 2-8 Upper drum replacement

2. Unsolder the upper drum board by an unsoldering iron to take it off, remove a screw ① and then pull out the upper drum upwards.
 3. Clean contact surfaces of a new upper drum and lower drum.
 4. Fix the upper drum board to the upper drum.
 5. Set the upper drum with the most careful attention to its position.
 6. Adjust eccentricity of the upper drum. (Refer to Section 2.5.4.)
 7. Install the brush assembly.
- When re-assembling, take care so that its contact point slightly comes off the center of the drum shaft but to be within 2 mm dia.

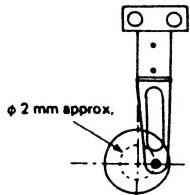


Fig. 2-9

8. After replacement, perform the following checks and adjustments.

- 1) Tape transport system adjustment
- 2) Switching point (Sect. 3.5.2)
- 3) Sub tracking (Sect. 3.5.3)
- 4) Head resonance and Q (Sect. 3.8.11)
- 5) REC FM level (Sect. 3.8.10)
- 6) PB level and channel balance (Sect. 3.8.12)
- 7) REC color level and channel balance (Sect. 3.8.17)

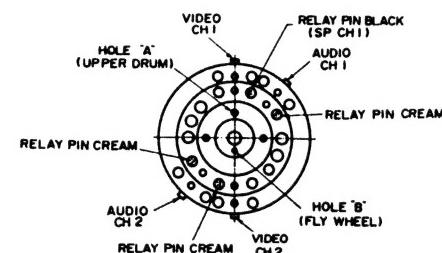


Fig. 2-10 Upper drum wiring

Note: Use care regarding position when installing the new upper drum. As shown in Fig. 2-10, observe that hole "A" (2.7 mm dia.) of the upper drum and hole "B" (1.6 mm dia.) of the flywheel are positioned 180° apart.

2.5.3 Lower drum motor ass'y

Note: The drum motor and the lower drum cannot be replaced separately.

1. Take off the cleaning ass'y behind the drum ass'y.
2. Take off the upper drum.
3. Remove screws ④ and pull out the drum ass'y upwards.
4. Install a new lower drum motor ass'y in the reverse order of the disassembling. At this time, be careful not to damage and scratch it.
5. Adjust eccentricity of the upper drum.
6. Perform the same checkup and adjustment as that for the upper drum replacement.

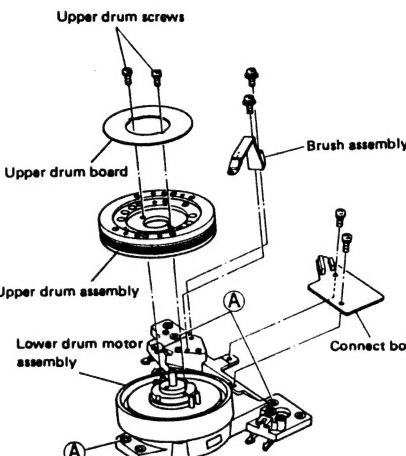


Fig. 2-11 Lower drum motor assembly

2.5.4 Upper drum eccentricity

- If the upper drum is mounted even slightly out of center with respect to the drum shaft, relative head-to-tape speed becomes inconsistent within the rotation period of the upper drum. This can cause jitter and picture distortion.
- After the upper drum is replace, perform the following adjustments.

1. Set the operation preset and then set for the Play mode.
2. After completion of loading, switch off the power.
3. Remove the earth plate.

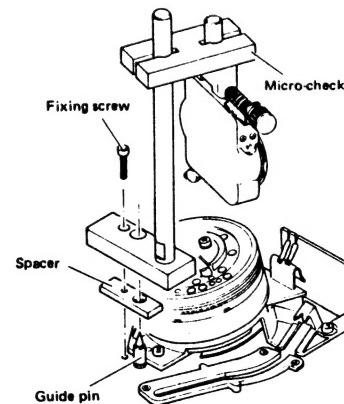


Fig. 2-12 Micro-checker mounting

4. Set the micro-checker (PUJ49712-2) on the guide pin as shown in Fig. 2-12. Use the accessory hex wrench (metric) to tighten the fixing screw.
5. Gradually turn the fine adjust knob clockwise so that the dial indicator registers zero on the scale. Adjustment of ±10 scale divisions is possible on the outer frame, but do not turn more than that.
6. While using care not to apply lateral pressure to the drum, slowly turn the upper drum and read the deviations indicated by the micro checker. Check for needle deflection within 2 microns (± 1 microns).
7. If deviation is greater than 2 microns, turn the fine adjust knob counterclockwise to disengage the test probe from the drum. Loosen the 2 screws of the upper drum, carefully adjust the position, then retighten the 2 screws in a balanced manner. Afterwards, again use the micro-checker to check the eccentricity.
8. After using, turn the fine adjust knob counterclockwise and remove the micro-checker.
9. Install the earth plate.
10. Supply power and set for the Stop mode. Be sure to remove the cover.
11. Connect oscilloscope to TP8 of the Pre/Rec board.
12. Gradually turn the TRACKING control and confirm simultaneously maximum CH-1 and CH-2 waveforms.
13. If difference is obvious, remove the upper drum, clean the bottom face of the upper drum and the lower drum flywheel. Reinstall and repeat above steps 1 to 10.

Microchecker handling

- The Microchecker is a high precision instrument. Do not subject it to vibration or shock.
- Do not apply unnecessary force to the measuring probe.
- The meter and holder position and direction have been pre-adjusted. Do not disassemble or disturb the adjustment.
- The meter outer rim can be turned about ± 10 scale divisions. Do not turn it forcibly (more than 300 g-cm).
- Use care that the Microchecker does not directly contact the upper drum (particularly the video heads).
- Before setting the Microchecker, turn the calibration knob counterclockwise. Avoid contacting the upper drum when setting.
- When setting, confirm that the measuring probe operating direction is centered on the upper drum.
- If rubbing or grating sound occurs during measurement, the setting is incorrect. Also check for contamination of the upper drum and measuring probe.
- Since the instrument is set while the loading arm is extended, power must not be supplied while the Microchecker is being used.

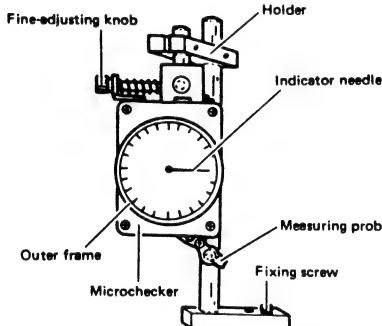


Fig. 2-13 Micro-checker

2.5.5 Capstan motor assembly

The capstan motor cannot be replaced as a single motor component. Replace the capstan motor ass'y which includes the capstan, capstan FG and flywheel when the capstan motor requires replacement. Do not take out the two screws on the bottom side.

- Disengage the connector from the capstan motor assembly (from the bottom side).
- Take out the three screws and remove the capstan motor ass'y.
- Install a new capstan motor ass'y by reversing the above steps.

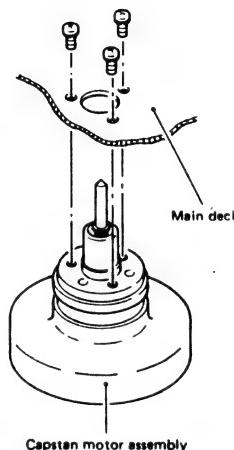


Fig. 2-14

2.5.6 Supply reel motor

- Remove the cassette housing ass'y (refer to section 2.5.1).
- Take out screw ① and move the tension band to the side.
- Take out the screw ② and E-ring then remove the supply reel FG board and supply brake.
- Loosen the setscrew and remove the supply reel disk ass'y in the upward direction.
- Disengage the connector, from the reel motor (from the bottom side).
- Take out the four motor screws and remove the supply reel motor.
- Install a new supply reel motor and reassemble by reversing the above steps.
- Perform the reel disk height adjustment (refer to section 2.6.2).

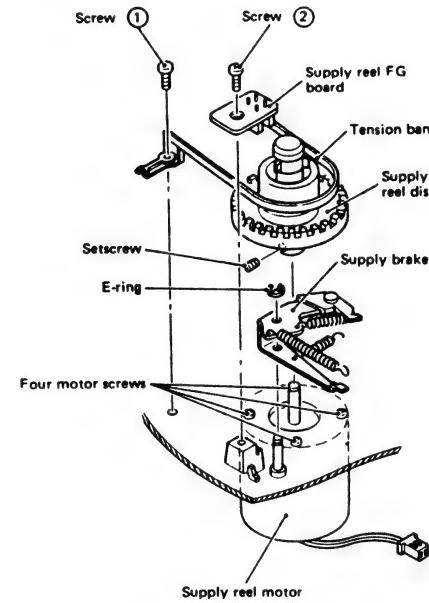


Fig. 2-15 SUP. reel motor

2.5.7 Take-up reel motor

- Remove the cassette housing ass'y (refer to section 2.5.1).
- Take out the screw and two E-ring, then remove the take-up reel FG board and take-up brake.
- Loosen the setscrew and remove the take-up reel disk ass'y in the upward direction.
- Loosen the two screws and remove the brake solenoid.
- Disengage the connector from the take-up reel motor.
- Take out the four screws and remove the take-up reel motor.
- Install a new take-up reel motor and reassemble by reversing the above steps.
- Perform the reel disk height adjustment (refer to section 2.6.2).

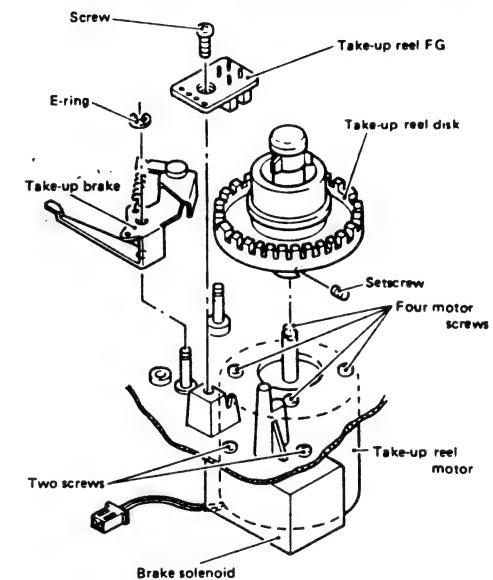


Fig. 2-16

2.5.8 Loading drive gear assembly/loading motor

Note: Before replacing the loading motor, carefully observe its mounting condition (particularly wire polarities, positioning and clamping).

1. Take out the two screws **(A)** and remove the loading drive gear assembly.
2. Unsolder the wires from the motor terminals.
3. To replace loading drive gear assemblies, place a new assembly by reversing the above steps and proceed to 7 below and after. In case of motor replacement, proceed to 4 below.
4. Disengage the belt from the pulley, take out the two screws **(B)** and remove the motor from the loading gear assembly.
5. Place a new loading motor and reassemble by reversing the above steps. At the time, use care as to wire polarities. Use a 0.5 mm thickness gauge to mount the motor pulley.
6. Move the pole base on the subdeck by hand to the loading end position and install the loading gear assembly.
7. Turn the loading motor pulley by hand to move the loading ring slightly in the unloading direction. Check for equal spacing between the supply pole guide and supply pole base, and between the take-up pole guide and take-up pole base. See Fig. 2-18. If not equal, the loading gear ass'y mounting position is incorrect. Repeat the above step 6.

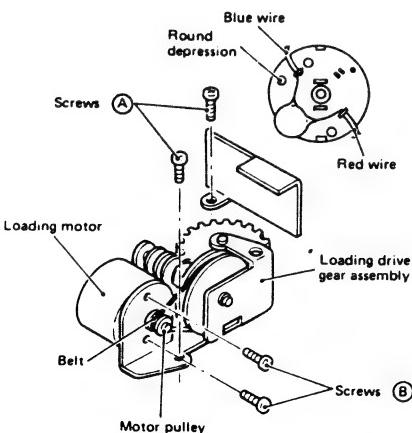


Fig. 2-17 Loading motor replacement

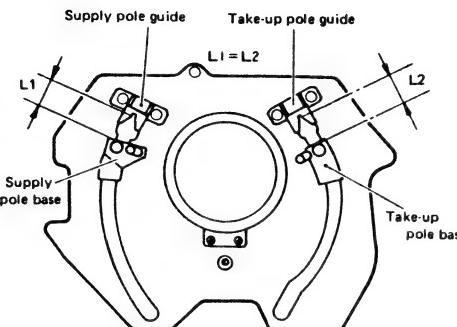


Fig. 2-18 Loading ring check

2.5.9 Audio/control (A/C) head assembly

1. Take out screws **(A)**, **(B)** and **(C)** to remove the A/C head assembly.
- Note:** Use care so that the coil springs do not come off from the bottom side of the A/C head assembly.
2. Remove the A/C head circuit board. Use care not to damage the wires.
3. Replace the A/C head subassembly and reassemble by reversing the above steps.
4. Perform the following checks and adjustments.
 - 1) Audio/control head parallel (refer to section 2.6.11)
 - 2) Tape transport (refer to section 2.7)
 - 3) Audio/control head height (refer to section 2.8.4)
 - 4) Audio/control head azimuth (refer to section 2.8.5)
 - 5) Audio/control head position (refer to section 2.8.7)
 - 6) Interchangeability adjustment (refer to section 2.8)
 - 7) Audio adjustment (refer to section 3.7)

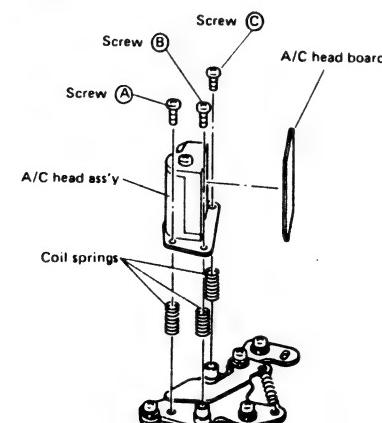


Fig. 2-19 A/C head replacement

2.6 CHECKS AND ADJUSTMENT

2.6.1 Master plane jig setting

1. Remove the cassette housing assembly.
2. As shown in Fig. 2-20, position the master plane jig with respect to the reference shaft, pinch roller shaft and the stud.

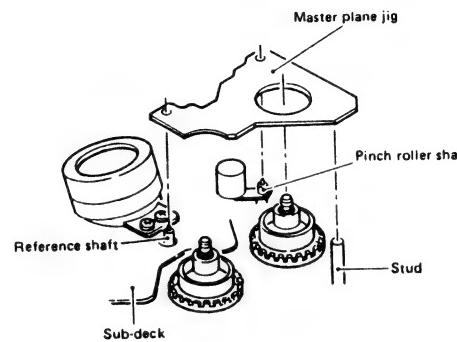


Fig. 2-20 Master plane jig setting

2.6.2 Reel disk height

1. Set the master plane jig.
2. Use the height gauge (PUJ42147-2) to confirm that the reel disk height. Measure at 2 places 90° apart. When measuring, press the reel disk downward to compensate for mechanical play.
3. The correct height is between planes A and B, as shown in Fig. 2-21. If necessary, loosen the setscrew and adjust to the correct height.

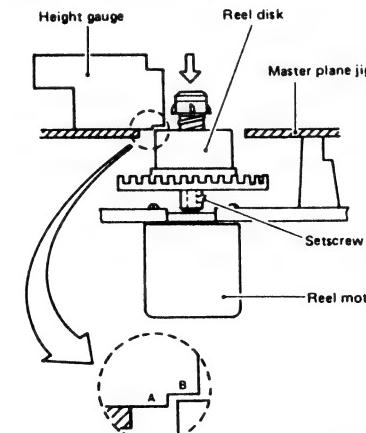


Fig. 2-21 Reel disk height adjustment

2.6.3 Supply guide pole height

1. Set the height gauge (PUJ42147-2) on the subdeck and check the perpendicularity.
2. Confirm that the height of the lower face of the upper flange.
3. If guide pole height has been adjusted, tape transport adjustments are required (refer to section 2.7).

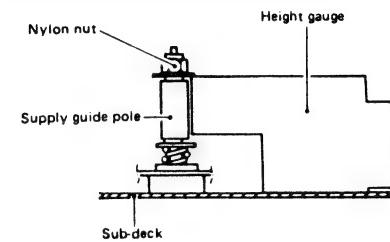


Fig. 2-22 Supply guide pole height adjustment

2.6.4 Take-up tape guide roller height

1. Set the master plane jig. Use the height gauge (PUJ44650) to confirm that the height of the lower face of the upper flange.
2. If necessary, loosen the setscrew on the lower part, then adjust the height by turning the screw on the top.
3. If the height has been adjusted, tape transport adjustments are required (refer to section 2.7).

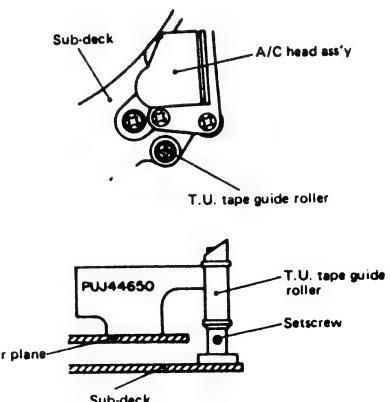


Fig. 2-23 Take-up tape guide roller height adjustment

2.6.5 Take-up tape guide roller parallel

- Put the place surface of A/C head parallel check plate against the capstan shaft and take-up guide roller.
- Check that the parallel degree between the capstan shaft and take-up tape guide roller is less than 0.05 mm.

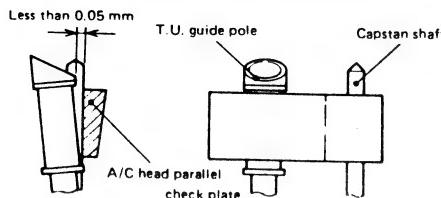


Fig. 2-24 Take-up guide roller parallel

2.6.6 Pinch roller

- By hand, press the pinch roller pressure arm toward the arrow A to the point where it contacts the capstan.
- Check that the parallel degree between the pinch roller and capstan is less than 0.05 mm.

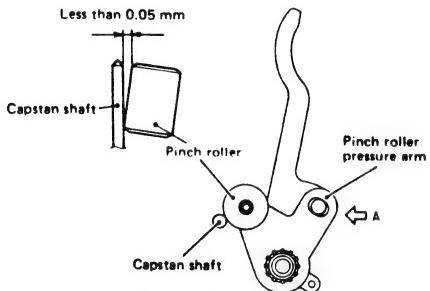


Fig. 2-25 Pinch roller

2.6.7 Tension band

- Take out screw ① and remove the tension band holder.
- Disengage the tension band from the tension arm, and replace the tension band.
- Perform the tension pole position check and adjustment and the back tension check (refer to sections 2.6.8 and 2.6.9).

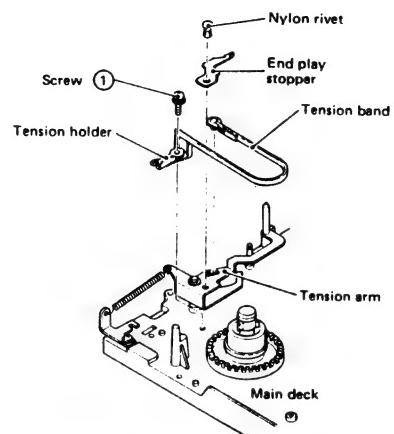


Fig. 2-26 Replacement of tension band

2.6.8 Tension pole position check

- Set for the Play mode of the operation preset.
- Confirm that the center of the tension pole lies upon the center line of the sub-deck hole as shown in Fig. 2-27.
- If necessary, loosen screw ① and adjust the tension band holder to obtain the correct tension pole position.

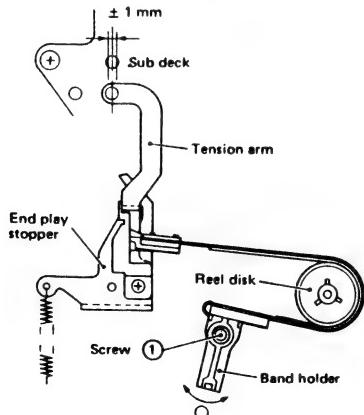


Fig. 2-27 Tension pole position

2.6.9 Back tension check

- Perform the following check after completing tension pole position check (refer to section 2.6.8).
- Use the back tension cassette gauge and set for the Play mode (PUJ42881).
- During the Play mode, check that the left side meter indicates 41 ± 1 g-cm.
If not the correct value, replace the tension band (refer to section 2.6.7).

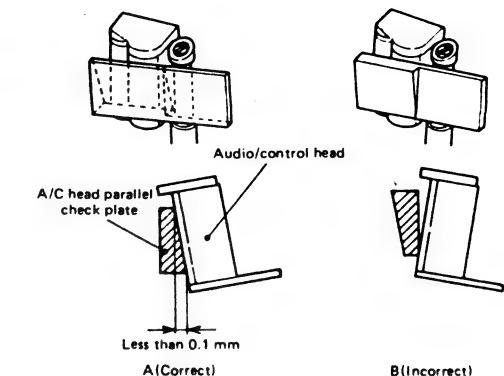


Fig. 2-29

2.6.10 Tension pole perpendicularity

- Set for the Play mode of the operation preset. Turn off the power in this state.
- Set the height gauge on the subdeck and press the tension arm toward the arrow B to the point where the tension arm contact the height gauge lightly.
- Check that the perpendicularity degree between the tension pole and height gauge is less than 0.05 mm.

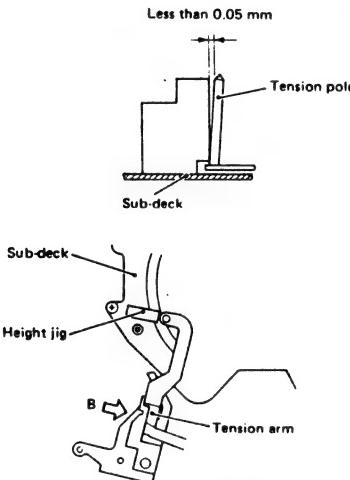


Fig. 2-28 Tension pole perpendicularity

2.6.12 Torque adjustment

Perform the following checks and adjustment after completing reel servo adjustment.

[A] Loading supply back tension

- Use the cassette torque meter (PUJ42881) and set for the Play mode.
- During the loading mode, check that the left side meter indicates 33 ± 10 g-cm.
- If not, adjust R29 of the reel servo board for 33 ± 10 g-cm (between TP-10 and heatsink of Q10 level of the reel servo board is 30 ± 2 mV).

[B] Playback back tension

- Use the cassette torque meter (PUJ42881) and set for the Play mode.
- During the Play mode, check that the left side meter indicates 41 ± 5 g-cm.
- If not, confirm that the tension pole position.
- If 41 ± 5 g-cm back tension cannot be obtained by step 3, replace the tension band (refer to section 2.6.7).

[C] Playback take-up torque

- Use the cassette torque meter (PUJ42881) and set for the Play mode.
- During the Play mode, check that the right side meter indicates 100 ± 20 g-cm.
- If not adjust R142 of the reel servo board for 100 ± 20 g-cm.

[D] Fast Forward (FF) and Rewind (REW) torque
 1. Set the operation preset.

2. Use the torque gauge (PUJ48075-3) and set it on the take-up reel disk.
3. Hold the torque gauge, then set for the FF mode.
4. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speeds, then read the indication. The correct value is 300 g-cm or more.
5. In the same manner, check the rewind mode.
6. If incorrect value, check the reel servo unit.

[E] Fast Forward (FF) and Rewind (REW) reel brake torque
 1. Set the operation preset.

2. Set for the Stop mode, then let the supply brake and take-up brake move toward the arrow C.
3. Set the torque gauge on the take-up reel disk. Relax the grip on the gauge so that the disk turns slowly in the direction of the arrow B. Read the indication at the point where the indicator and scale rotate at equal speed. The correct value is 22 ± 7 g-cm.
4. In the same manner, check the rewind mode. Set the gauge on the supply reel disk and let the disk turn in the direction of the arrow A. The correct value is 22 ± 7 g-cm.



(a) FF/REW Torque

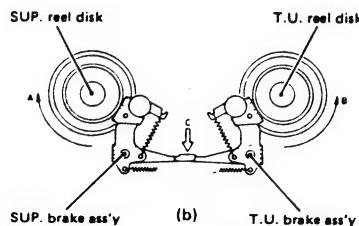


Fig. 2-30

[F] Unloading supply tension

1. Use the cassette torque meter (PUJ42881-B) and change for the Stop mode from the Play mode.
2. During the unloading mode, check that the left side meter indicates 52 ± 15 g-cm and the TP-10 level of reel servo board is 65 ± 10 mV DC.
3. If not, adjust R32 of the reel servo board for 52 ± 15 g-cm.

2.7 TAPE TRANSPORT

The tape transport system has been precisely adjusted at the factory and normally does not require readjustment. The following steps are therefore necessary only in case of severe usage or when replacing parts affecting the tape transport system.

2.7.1 Tape transport check

1. Employ a 120 minute tape and check at tape beginning and ending portion according to the following steps.
2. Operate the machine between Loading and Unloading modes several times. Observe the tape at the supply and take-up guide rollers. Confirm absence of curling, wrinkling.
3. During the Play mode, confirm absence of curling, wrinkling.

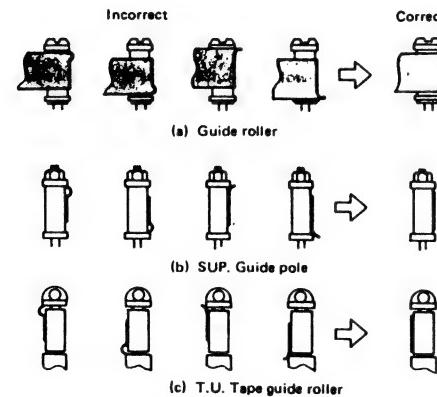
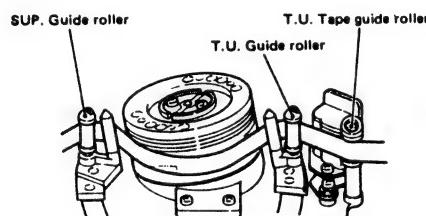


Fig. 2-31 Guide roller and Guide pole

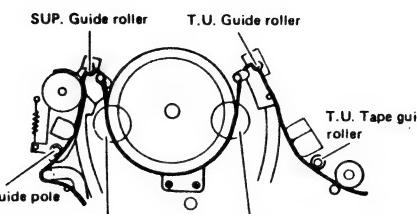


Fig. 2-32 Tape transport check

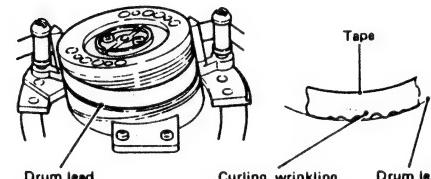


Fig. 2-33 Drum lead check - 2

Notes:

- 1) Slips upward : sound becomes produced by contact between tips of rotating heads and edge of tape.
- 2) Slips downward : tape curls or wrinkles from contacting lead face (sound may also be produced).
- 3) If necessary, perform adjustments according to section 2.7.2.

2.7.2 Tape transport adjustments

Perform only if defects are noted during tape transport check (2.7.1).

- If the height has been adjusted, interchangeability adjustments are required (section 2.8).

[A] Guide roller height

1. Loosen the setscrew on the side to be adjusted. Loosen it only enough to allow the guide roller to be turned smoothly with a slotted screwdriver. Use care not to overloosen it.
2. Insert a cassette tape and set for the Play mode.
3. With a slotted screwdriver, turn the guide roller and adjust so that the tape travels smoothly in the drum lead.
4. Check the top edge of the tape travels along the lower face of the upper flange as shown in Fig. 2-34.
5. Tighten the setscrew after completion of adjustment.

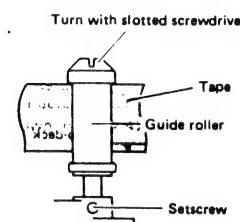


Fig. 2-34 Guide roller

[B] Supply guide pole

1. Use a cassette tape and set for the Play mode.
2. Use a nut driver to adjust so that curling or wrinkling of the tape does not occur at the supply guide pole.

Note: This adjustment must be within 0.5 mm (one nut turn is 0.5 mm) with respect to the height adjusted in section 2.6.3. If there is a large discrepancy, check the height of the supply reel disk, (refer to section 2.6.2), tension pole (refer to section 2.6.10) and other mechanical components.

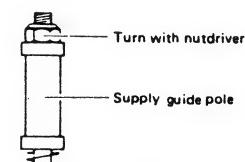


Fig. 2-35 Supply guide pole

- [C] Take-up tape guide roller height
1. Use a cassette tape and set for the Play mode.

2. Loosen the setscrew, and use care not to over loosen it. Adjust by turning the top of the tape guide roller with a slotted screwdriver so that curling or wrinkling of the tape does not occur at the take-up guide roller.

3. Tighten the setscrew after completion of adjustment.

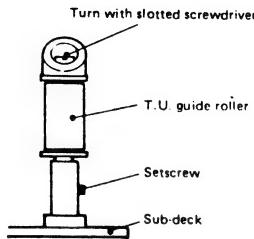
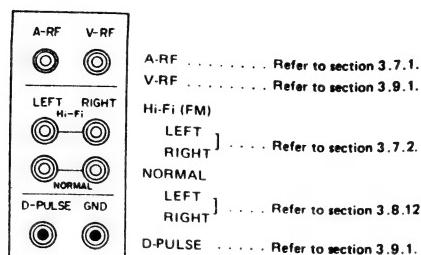


Fig. 2-36 Take-up tape guide roller

2.8 INTERCHANGEABILITY ADJUSTMENT

Before using the alignment tape, employ a cassette tape and confirm correct tape transport referring to section 2.7.



Front service terminal (Front panel)

Fig. 2-37 Check point

2.8.1 Preliminary checks

1. Connect oscilloscope to V-RF of the Front service terminal (or PRE/REC TP-8). At this time, trigger the oscilloscope externally with the signal from D-PULSE of the Front service terminal (or TP-5 of the D/C servo board).
2. Play starirstep signal segment of the alignment tape MH-2.
3. Turn the tracking control and adjust for maximum FM output.
4. Observing the oscilloscope, adjust the flat portion of the maximum output level ('a' in Fig. 2-38) becomes 4 scale divisions. In this condition, next confirm that the level 'b' is more than 3.4 scale divisions (-1.5 dB) in comparison to the level 'a'. At the above measurement, each level should be read at a portion where serrations are comparatively flat.

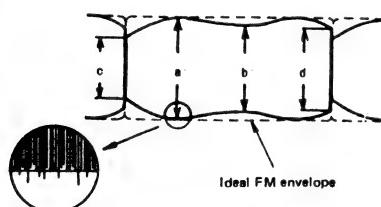


Fig. 2-38 FM waveform (max. output)

5. When levels 'c' and 'd' (for drum intake and outlet) are 4.0 scale divisions respectively, confirm that level drop at either side of SUP and TU is more than 2.8 scale divisions (-3.0 dB).
6. Turn the Tracking control from end to end. The waveform variation should be nearly parallel as shown in Fig. 2-39 and 2-40.

7. If steps 4 to 6 above are unsatisfied, adjustments are required.

Perform adjustments of section 2.8.2 to 2.8.9.

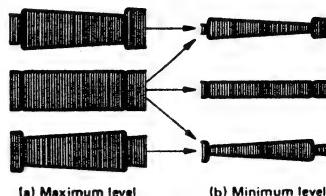


Fig. 2-39 Normal waveform examples



Fig. 2-40 Incorrect waveform examples

2.8.2 Preliminary adjustments

1. Connect oscilloscope to V-RF of the Front service terminal. Trigger the oscilloscope externally with the signal from D.PULSE of the Front service terminal.
2. Play starirstep signal segment of the alignment tape MH-2.
3. Turn the Tracking control and adjust for maximum FM output.

Drum input

4. Refer to Fig. 2-41. Examples of incorrect waveforms are shown by A and B. Adjust the supply guide roller so that the rising portion (drum input portion) of the waveform becomes flat as shown by C.

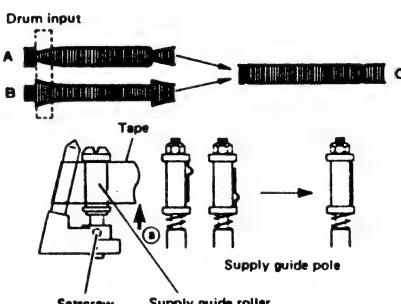


Fig. 2-41 Drum input adjustment

5. Observe the top edge of the tape travels along the lower face of the upper flange and check the waveform does not fluctuation as the tape is lightly pushed up at point (a) as shown in Fig. 2-41.
6. At this time, confirm absence of curling or wrinkling at the guide pole. If contact noise is heard, reconfirm section 2.6.3 and 2.7.

Drum output

7. In the same manner as for the drum input, turn the take-up guide roller to adjust the decay portion (drum output portion) of the FM waveform. Incorrect examples are shown by D and E in Fig. 2-42, while F indicates the correct adjustment.
8. Observe the top edge of the tape travels along the lower face of the upper flange and check the waveform does not fluctuation as the tape is lightly pushed up at (b) as shown in Fig. 2-42.
9. At this time, confirm absence of curling or wrinkling at the take-up tape guide roller. If contact noise is heard, reconfirm section 2.6.4 and 2.7.
10. Carefully and evenly adjust screws (A), (B) and (C) to align the audio/control head height with the tape as shown in Fig. 2-43.

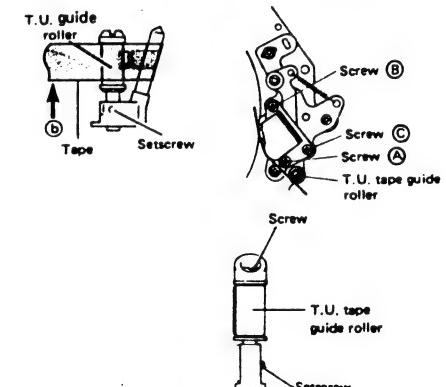
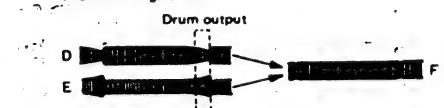


Fig. 2-42 Drum output adjustment

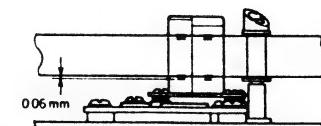


Fig. 2-43 Audio/control head height

2.8.3 Fine adjustment

- After completion of preliminary checks, connect oscilloscope to V-RF terminal. Observe FM waveform and adjust the Tracking control for minimum FM output level. Trigger the oscilloscope externally with the signal from D. PULSE terminal.
- If the waveform becomes as shown by A or B of Fig. 2-44, carefully adjust the supply guide roller height so that the waveform becomes as shown by E, F or G of Fig. 2-45.
- If the FM waveform appears as shown by C or D in Fig. 2-44, carefully adjust the take-up guide roller height to obtain a waveform such as shown by E, F or G of Fig. 2-45.
- At this time, if the waveform fluctuates, adjust to the point of minimum fluctuation.
- Vary the Tracking control from maximum to minimum FM output. The waveform variation should be nearly parallel as shown in Fig. 2-46. If not, readjust items in section 2.8.2 and 2.8.3.
- Confirm the audio/control head height (section 2.8.4), azimuth (section 2.8.5) and audio/control head position (section 2.8.7).



Fig. 2-44 Minimum FM output (incorrect examples)

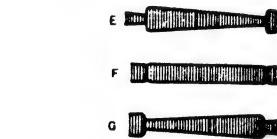


Fig. 2-45 Minimum FM output (correct examples)

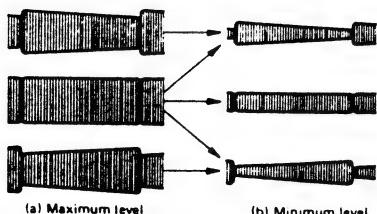


Fig. 2-46 Correct waveform

Note: Setscrew tightening

1) After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews while in the Stop mode.

Since the guide rollers are easily moved, use care when tightening.

2) Again perform the preliminary checks (refer to section 2.8.2).

2.8.4 Audio/control head height

- Connect an oscilloscope to LEFT/RIGHT (NORMAL) of the Front service terminal.
- Play 1 kHz signal segment of the alignment tape MH-1.
- Check that the audio CH-1 (LEFT) output level increase does not exceed 0.5 dB as the tape is lightly pressed down point (a) as shown in Fig. 2-47.
- In the same manner, check that the audio CH-2 (RIGHT) output level increase does not exceed 0.5 dB as the tape is lightly pushed up at point (b).
- If level increase is more than 0.5 dB in step 3 or 4, perform following adjustment.

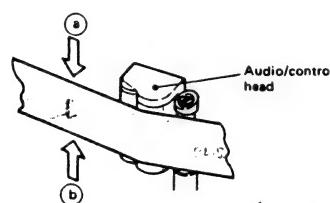


Fig. 2-47 Audio head height check

- Connect CH-1 probe of the oscilloscope to LEFT (NORMAL) and CH-2 probe to RIGHT (NORMAL) of the Front service terminal.
- Adjust the oscilloscope for equal maximum levels for CH-1, when the tape is lightly pressed downward at point (a), and CH-2, when the tape is lightly pressed upward at point (b).
- Turn screws (A), (B) and (C) in succession by small and equal increments at a time and adjust for the same levels between CH-1 and CH-2.
- If tape curling, wrinkling, etc. occurs at the T.U. tape guide roller, reconfirm section 2.6.4 and 2.7.

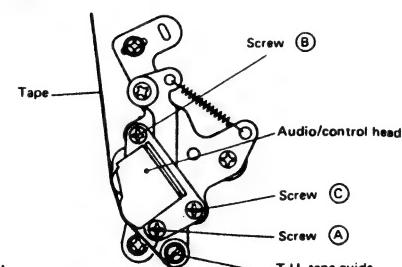


Fig. 2-48 A/C head height adjustment

2.8.5 Audio/control head azimuth

- Perform the following steps only after completing section 2.8.4.
- Connect CH-1 probe of the oscilloscope to LEFT (NORMAL) terminal and CH-2 probe to RIGHT (NORMAL) terminal.
- Play 6 kHz signal segment of the alignment tape MH-2.
- Adjust screws (A) and (B) (shown in Fig. 2-48) for both maximum output levels and absence of phase difference between CH-1 and CH-2.
- Confirm the audio/control head height (section 2.8.4).

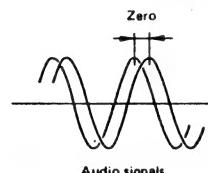


Fig. 2-49 Audio head phase adjustment

2.8.6 Servo circuit adjustment

- Perform P.B./REC switching point adjustment (refer to section 3.5.2).
- Perform Sub Tracking adjustment (refer to section 3.5.3).

Note: Sub Tracking adjustment has been precisely adjusted at the factory normally does not require readjustment.

The following adjustment are therefore necessary only in case of H distortion becomes produced by during the P.B. mode to E-E mode or when replacing Sub, Tracking VR.

2.8.7 Audio/control head position

Perform the following steps only after completing section 2.8.1 through 2.8.5.

- Connect oscilloscope to V-RF of the Front service terminal.
- Take out a screw of the cleaner assembly.
- Play stairstep signal segment of the alignment tape MH-2.
- Turn the Tracking control and confirm that the maximum FM level is obtained at the center click position.
- If not, set the Tracking control to center click position.
- Loosen the three screws (D), (E) and (F) and slide the audio/control head assembly fully in the direction of the drum (indicated by the arrow) as shown in Fig. 2-50.
- Slightly tighten the three screws (D), (E) and (F) and play stairstep segment of the alignment tape MH-2.

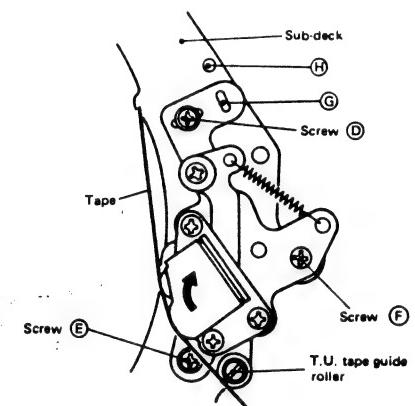


Fig. 2-50

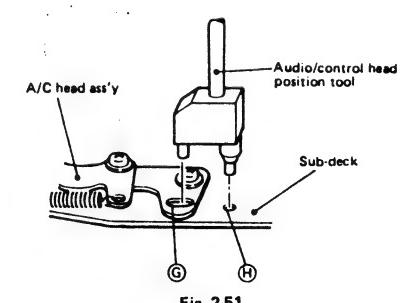


Fig. 2-51

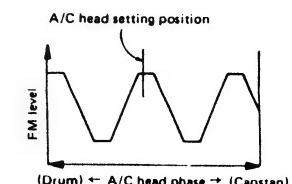


Fig. 2-52

2.8.8 Final checks

- Reconfirm section 2.8.1.
If incorrect FM waveform, replace the upper drum assembly (refer to section 2.5.2).
- Connect an oscilloscope to V-RF and A-RF (or TP7 of the FM Audio board) of the Front service terminal. With dual trace mode, trigger the oscilloscope externally with signal from D. PULSE of the Front service terminal.
- Play stairstep signal segment of the alignment tape MH-2.
- Set the trigger to + slope and observe the video FM waveform (CH-2).
- Turn the Tracking knob to obtain the maximum video FM waveform.
At this time play carrier signal segment of the alignment tape MH-F8 and observe the audio FM waveform (b).
- Turn the Tracking knob to obtain the maximum audio FM waveform (a).
Observe the audio FM waveform (a) and confirm that the level difference between audio FM waveform (b) and the maximum level (a) obtained manually is:

$$\frac{b}{a} \geq 0.9$$



Fig. 2-53 Audio FM output level

- When the maximum video FM waveform, confirm the audio FM waveform (Fig. 2-54) obtained that:

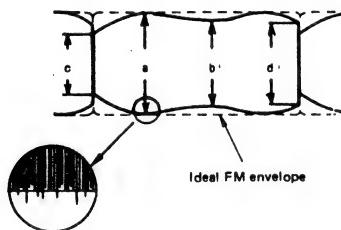


Fig. 2-54 FM waveform (max. output)

$$\frac{b}{a} \geq 0.8, \frac{c}{a} \geq 0.64, \frac{d}{a} \geq 0.64$$

(Specifications of audio FM waveform)

Note: If the FM dropout is noted, perform the FM audio switching point adjustment (refer to section 3.7.5) before confirmation.

- Play back audio FM waveforms (CH-1 and CH-2) which were recorded without audio signal input respectively, and confirm that both of them meet the FM waveform specification.

Check level variation of the FM waveforms, which should be more than 3.6 scale divisions as the reference is 4 scale divisions on the oscilloscope. (VIDEO: -1.0 dB, FM AUDIO: -1.0 dB)
Also check that the FM level drop is more than 3.0 scale divisions against 4 scale divisions. (VIDEO: -2.5 dB, FM AUDIO: -2.5 dB)
Change the tape to a thin blank tape (T-160) and perform recording and playback in the same manner as above to confirm again that the FM level drop is less than -4 dB (more than 2.5 scale divisions against 4 scale divisions).

Note: For observing FM AUDIO waveform on the oscilloscope, connect the probe to TP7 of the FM AUDIO board.

- If FM waveform is still incorrect by the adjustments from the steps 1 through 5, replace the upper drum assembly (refer to section 2.5.2).

Note: Refer to section 2.8.9.

- Perform overall checks and adjustments of the servo circuit and video, and then perform the audio circuit adjustment.

2.8.9 Reference

- When audio FM waveform is not yet standardized after the final checks (section 2.8.8), a satisfactory result can be obtained by adjusting heights of the audio and video heads with a VH microscope (PUJ42990) used as an adjusting equipment.
- Referring to section 2.5.1 set the machine into the operation preset condition for Play mode and then turn off the power.
- Set the VH microscope (PUJ42990) on the guide pin as shown in Fig. 2-55.

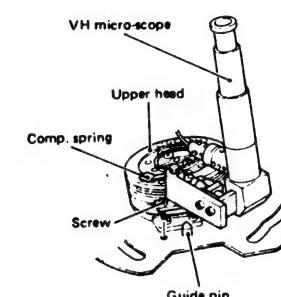
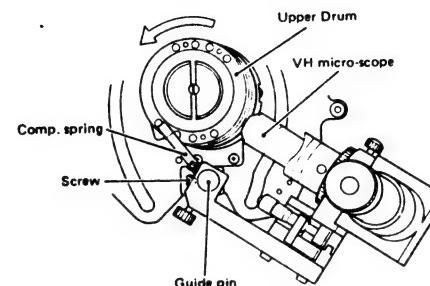


Fig. 2-55 VH microscope setting

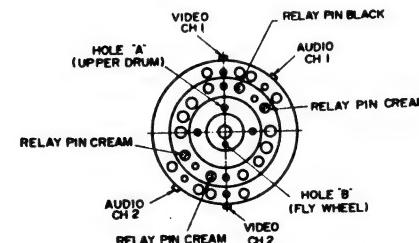


Fig. 2-56 Head position

- Confirm that "H" of the value of the relative height between V2 and A1 is as shown in the following table.

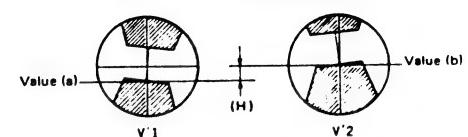
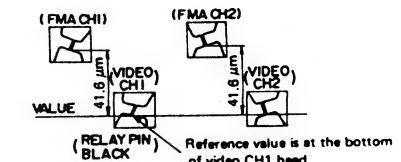


Fig. 2-57 Audio head and video head heights

A/V head	V2 - A1	V1 - A2	V1 - V2	A1 - A2
H	$41.6 \pm 1 \mu$	$41.6 \pm 1 \mu$	$0 \pm 1 \mu$	$0 \pm 1 \mu$

- How to confirm "H" value

- Read the value of "a" of V2 on the VH microscope.
- Lifting the rotation prevention spring upwards turn the upper drum slowly counterclockwise and stop it at the position A1 and fix the spring. At this position read the value (b).
- Read the value of "H" (difference between "a" and "b"). (one graduation of the scale is 2μ).
- If the value differs from the standard, tighten the setscrew of V2 first, then tighten the A1's setscrew to obtain a satisfactory result.
- In the same manner as above, read the values and obtain satisfactory results for V1 - A2, V1 - V2 and A1 - A2, respectively.
- Confirm that the FM waveforms (CH-1/CH-2) recorded and played back without audio signals by the machine are the standard.
- Totally check up the servo and video systems, and then do for the audio system.

Note: Contact JVC regarding the VH microscope (PUJ42990).

2.8.10 A/C head position (X value)

1. Connect a dual-trace oscilloscope to the front V-RF test point and to the rear panel AUDIO OUT.
2. Set the oscilloscope to "Chop" mode and use internal trigger.
3. Loosen screws ①, ② and ③ to allow sliding the A/C head.
4. Play the MHPE-X alignment tape. Set the TRACKING control to the center detent position.
5. Use the A/C head positioning tool to adjust the head position to align the phases of the audio and FM waveforms. Also adjust for maximum overall FM output.
6. Play the FM AUDIO carrier signal of the MH-F8 alignment tape.
7. Connect the oscilloscope to front A-RF. From the Step 5 position, shift the A/C head to the nearest maximum FM position. Then tighten screws ①, ② and ③.
8. Operate the TRACKING control and confirm maximum FM waveform at the center detent position.

Note: Contact JVC regarding the MHPE-X alignment tapes.

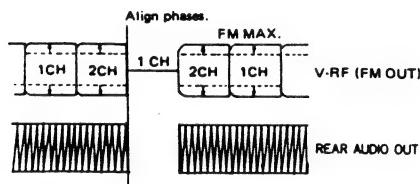
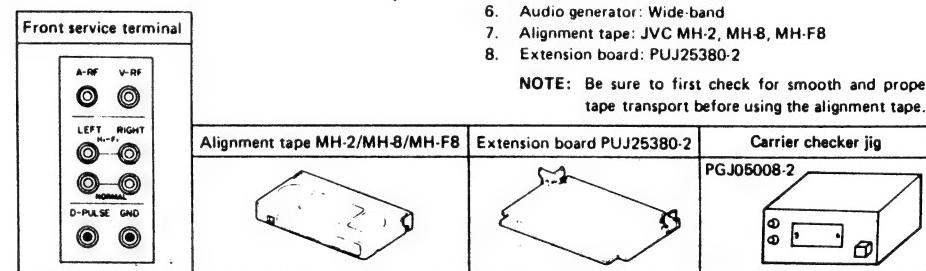


Fig. 2-58

SECTION 3 ELECTRICAL ADJUSTMENTS

3.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.



3.1.2 JVC alignment tape contents

1. MH-2 contents

Segment	Playback Time	Video Signal	Audio Signal	Applications
1	10 minutes	Stairstep	6 kHz	<ul style="list-style-type: none"> • Interchangeability checks and adjustments • Service circuit checks and adjustments • Audio head azimuth adjustments
2	5 minutes	(none)	3 kHz	<ul style="list-style-type: none"> • Tape speed checks • Wow and flutter checks
3	10 minutes	Color bar	1 kHz (0 dB)	<ul style="list-style-type: none"> • Video signal playback circuit checks and adjustments • Audio signal playback circuit checks and adjustments
4	3 minutes	RF sweep	(none)	<ul style="list-style-type: none"> • Video head resonance adjustments, Q adjustments Marker: 2 MHz, 4 MHz, 5 MHz

Table 3-1

2. MH-8 contents

Segment	Playback Time	Video Signal	Audio Signal	Applications
1	2 minutes	Color sweep	400 Hz (-20 dB)	<ul style="list-style-type: none"> • Video frequency response playback circuit checks and adjustments • Audio frequency response playback circuit checks and adjustments
2	2 minutes		100 Hz (-20 dB)	
3	2 minutes		8 kHz (-20 dB)	
4	4 minutes		(none)	

Table 3-2

3. MH-F8 (FM Audio) contents

Segment	Playback Time	Video Signal	Audio Signal	Applications
1	5 minutes	—	Carrier only	<ul style="list-style-type: none"> • Interchangeability checks for video and audio
2	5 minutes	—	1 kHz ($\pm 50\text{kHz}$ DEV.)	<ul style="list-style-type: none"> • FM audio signal playback circuit checks and adjustments

Table 3-3

3.1.1 Required test equipment and jig

1. Digital voltmeter: HEWLETT-PACKARD Model 3476A/B or equivalent
2. Oscilloscope: Wide-band, Dual-trace
3. Signal generator: Color bar, Stairstep
4. Frequency counter: HEWLETT-PACKARD Model 5381A or equivalent
5. Regulated DC power supply
6. Audio generator: Wide-band
7. Alignment tape: JVC MH-2, MH-8, MH-F8
8. Extension board: PUJ25380-2

NOTE: Be sure to first check for smooth and proper tape transport before using the alignment tape.

3.1.3 Check and Adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

Note: Do not use an alignment tape for the mechanism check and tape run check.

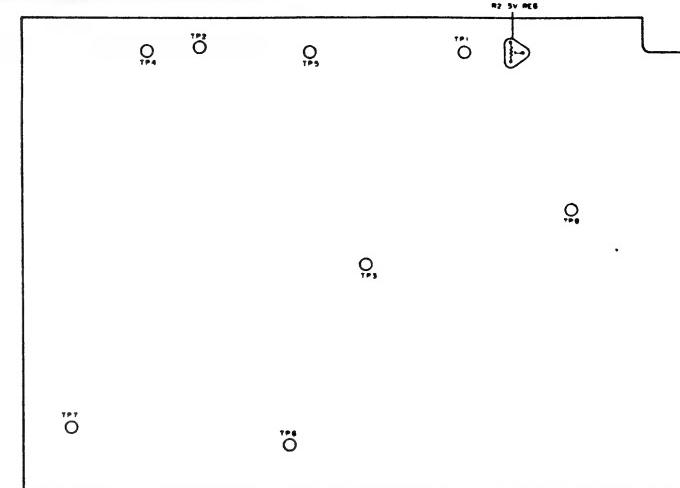
When you make the adjustment using the alignment tape, at first, check the tape run function using the recording tape.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (-) indicates check only.
Signal	Input signal required to perform adjustment. Dash (-) indicates that special signal is not required.
Color bar	Color bar signal as video input
Stairstep	Stairstep signal as video input
1 kHz	Supply a 1 kHz sinewave as audio input signal.
MH-2 Color bar	Play color bar segment of JVC MH-2 alignment tape.
MH-2 Stairstep	Play stairstep segment of JVC MH-2 alignment tape.
MH-2 3 kHz	Play 3 kHz audio signal segment of JVC MH-2 alignment tape.
MH-2 1 kHz	Play 1 kHz audio signal segment of JVC MH-2 alignment tape.
MH-2 RF Sweep	Play RF sweep segment of JVC MH-2 alignment tape.

MH-8 Color sweep	Play color sweep segment of JVC MH-8 alignment tape.
MH-8 400 Hz	Play 400 Hz audio signal segment of JVC MH-8 alignment tape.
MH-8 100 Hz	Play 100 Hz audio signal segment of JVC MH-8 alignment tape.
MH-8 8 kHz	Play 8 kHz audio signal segment of JVC MH-8 alignment tape.
MH-F8 Carrier	Play audio carrier segment of JVC MH-F8 alignment tape.
MH-F8 1 kHz (± 50 kHz DEV)	Play 1 kHz (\pm 50 kHz DEV) audio signal segment of JVC MH-F8 alignment tape.
Mode	Equipment operating mode at time of check or adjustment
STOP	Power on and machine in Stop mode
REC	Recording mode
P.B.	Play mode
REC → (another mode)	Use blank tape, record, then play back in the mode specified.
E-E	Input signal to output
FF	Fast Forward mode
REW	Rewind mode
PAUSE	Pause mode
Loading	Stop mode to playback mode
Unloading	Playback mode to Stop mode
Description and Waveform	This column provides an explanation of the step, notes, adjustment values and waveform diagrams.

3.2 POWER SUPPLY CIRCUIT

Regulator Board Adjustment Point (Top View)



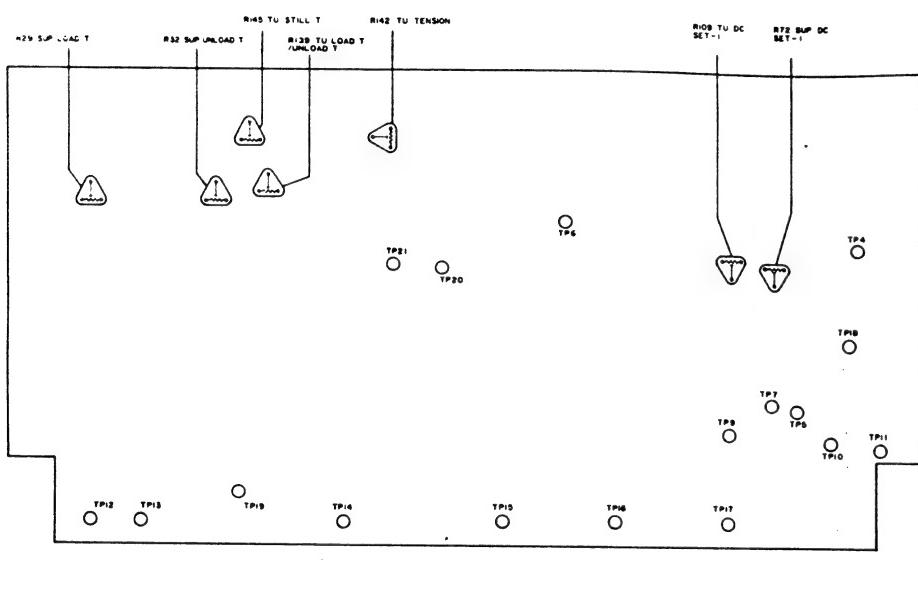
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	5 V DC output voltage	TP-1 [0] 7 Regulator	R2 (5 V Regulator)	-	P.B.	1. Connect the digital voltmeter to TP-1 of the power supply board. 2. Adjust R2 (5 V REG) for 5.0 ± 0.1 V DC.
2	16.5 V DC output voltage	TP-3 [0] 7 Regulator	-	-	P.B.	1. Connect the digital voltmeter to TP-3 of the power supply board. 2. Confirm that the DC voltage becomes 16.5 ± 1.0 V.
3	15 V DC output voltage	TP-6 [0] 7 Regulator	-	-	REC	1. Connect the digital voltmeter to TP-6 of the power supply board. 2. Confirm the DC voltage of 15 ± 1.0 V.
4	12 V DC output voltage	TP-4, TP-5 [0] 7 Regulator	-	-	P.B.	1. Connect the digital voltmeter to TP-4 of the power supply board. 2. Confirm the DC voltage of 12.0 ± 0.2 V. 3. In the same manner, confirm the TP-5.
5	12 V DC output voltage	TP-2 [0] 7 Regulator	-	-	P.B.	1. Connect the digital voltmeter to TP-2 of the power supply board. 2. Confirm that the DC voltage becomes 12.0 ± 0.4 V.

3.3 SYSTEM CONTROL (SYSCON) CIRCUIT

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	IC8 clock frequency	Pin 2 of IC8 [0] 8 Syscon	-	-	STOP	1. Connect frequency counter to pin 2 of IC8 and confirm that the frequency becomes $3,580 \pm 10$ kHz (over 2.5 Vp-p).
2	IC17 clock frequency	Pin 5 of IC17 [0] 8 Syscon	-	-	STOP	1. Connect frequency counter to pin 5 of IC17 and confirm that the frequency becomes 500 to 950 kHz (over 2.5 Vp-p).

3.4 REEL SERVO CIRCUIT

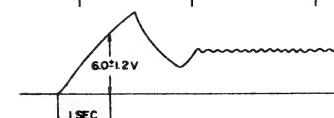
Reel Servo Board Adjustment Point (Top View)



LOADING/UNLOADING MOTOR VOLTAGE

	MODE	TEST POINT	VR	SPEC
SUP MOTOR VOLTAGE	LOADING	TP10	R29	$30 \pm 2 \text{mV}$
	UNLOADING	TP10	R32	$65 \pm 10 \text{mV}$
TU MOTOR VOLTAGE	LOADING	TP9	R139	$60 \pm 10 \text{mV}$
	STILL	TP9	R145	$55 \pm 15 \text{mV}$
	UNLOADING	TP9	—	$60 \pm 10 \text{mV}$

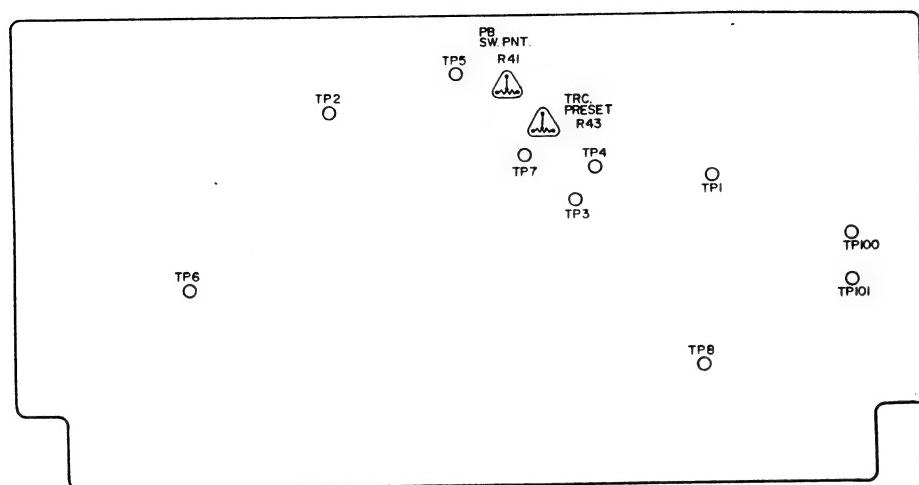
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	SUP. DC Set	TP-5 TP-12(GND) [2]0 Reel Servo	R72 (SUP. DC SET-1) [2]0 Reel Servo	—	STOP	1. Connect digital voltmeter to TP-5 of the Reel servo board. 2. Adjust R72 of the Reel servo board to obtain 6.0 V DC.
2	TU. DC Set	TP-7 TP-12(GND) [2]0 Reel Servo	R109 (TU. DC SET-1) [2]0 Reel Servo	—	STOP	1. Connect digital voltmeter to TP-7 of the Reel servo board. 2. Adjust R109 (TU. DC SET) of the Reel servo board to obtain 6.0 V DC.
3	SUP. LOAD Tension	TP-10 [2]0 Reel Servo	R29 [2]0 Reel Servo	—	LOAD-ING	See 2.6.12A.
	SUP. UNLOAD Tension	TP-10 [2]0 Reel Servo	R32 (SUP. UNLOAD Tension) [2]0 Reel Servo	—	UN-LOAD-ING	See 2.6.12F.
4	T.U. Tension	TP-9 [2]0 Reel Servo	R142 [2]0 Reel Servo	—	P.B.	See 2.6.12C.
5	T.U. LOAD/UNLOAD Tension	TP-9 [2]0 Reel Servo	R139 (T.U. LOAD/UNL. T.) [2]0 Reel Servo	—	LOAD-ING UN-LOAD-ING	1. Connect oscilloscope to TP-9 of the Reel servo board. 2. Set for the beginning portion of 120-minute tape, during the Loading mode, adjust R139 (T.U. LOAD/UNL. TENS.) of the Reel servo board to obtain DC voltage of $60 \pm 5 \text{mV}$. 3. During the Unloading mode, confirm that the voltage remains unchanged.
6	T.U. STILL Tension	TP-9 [2]0 Reel Servo	R145 (T.U. STILL TENS.) [2]0 Reel Servo	— P.B. ↓ PAUSE	PAUSE	1. Connect oscilloscope to TP-9 of the Reel servo board. 2. Set for the Pause mode with beginning portion of 120-minute tape and adjust R145 (T.U. STILL TENS.) of the Reel servo board to obtain DC voltage of $55 \pm 15 \text{mV}$.
7	FF & REW Torque	TP18 (REEL) External Trigger TP19 (REEL)	—	—	REW	1. Connect the oscilloscope's probes to TP18 and TP19 (IC4 pin 1) of the Reel Servo board and supply external trigger pulse to TP19. 2. With T-120 tape loaded by its beginning portion, set the deck to the REW mode. 3. Confirm that voltage at the section A of TP18 becomes $6.0 \pm 1.2 \text{V}$ 1 sec after that. 4. Set a torque meter to check that FF and REW torque is 430 g-cm each.



Note: To get the same earth level, the earth of the oscilloscope to be connected to the heatsink of Q10 transistor of the Reel servo board.

3.5 D/C SERVO CIRCUIT

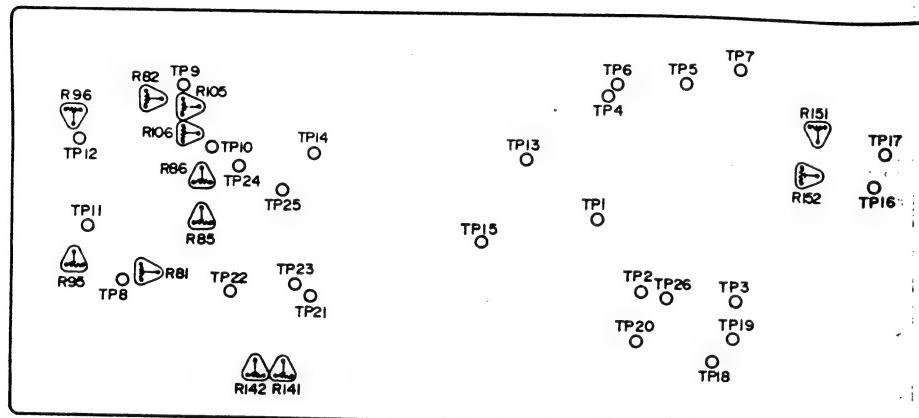
D/C Servo Adjustment Point (Top View)



No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	DRUM FG Level	TP6 (D/C Servo)	—	MH-2 Color Bar	PB	<ol style="list-style-type: none"> Connect the oscilloscope to TP6 of the D/C Servo board. Play the alignment tape MH-2. Confirm that signal levels A and B are as follows: A = 2.0 – 3.0 V DC B = 4.0 – 5.0 V DC <p>A = 2.0~3.0 VDC B = 4.0~5.0 VDC</p>
2	P.B. Switch Point	VIDEO OUT	R41 (D/C Servo)	MH-2	PB	<ol style="list-style-type: none"> Connect a probe of the oscilloscope to VIDEO OUT terminal and the other probe to TP5 (or servicing terminal) of the D/C Servo board, and supply external trigger pulse to TP5 (– [minus] slope). Play the staircase segment of the alignment tape MH-2. Adjust R41 so that trigger point is 6.5H after V. sync. Change the oscilloscope setting for + (puls) slope and confirm that difference between switching points of two channels is within 1H. <p>A = 6.5H</p>
3	SUB TRACKING Adjust	VIDEO OUT	R43 (D/C Servo)	Color Bar	REC ↓ PB	<ol style="list-style-type: none"> Supply color bars signal to VIDEO IN terminal. Set the TRACKING VR to its center detent position. Connect the oscilloscope to VIDEO OUT terminal and TP8 of D/C servo board to observe waveform in dual trace mode. Trigger the oscilloscope at rise of REC CTL pulse of TP8. In REC mode, record the section A of the signal (shown in the figure). Change connection of the oscilloscope's probe connected to TP8 to TP3 of the D/C servo board and trigger the oscilloscope at rise of TP3's pulse. Record the signal, and playing it back adjust R43 to equalize level B with A.

3.6 FM AUDIO CIRCUIT

FM Audio Board Adjustment Point (Top View)



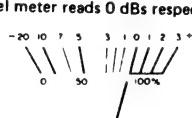
Note: Perform the following steps only after completing item 3.8.9 "Video REC FM Level", 3.8.17 "REC Color Channel Balance & Color Level".

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	Monitor Output Level	Hi-Fi (L/R) Front Service Terminal EXT. REC LEV VR ADJ.	—	1 kHz -6 dBs	E-E	1. After the adjustment of section 3.6.7 was finished, confirm that monitor output is -8 dBs to -4 dBs (0.86 - 1.39 Vp-p).
2	A. FM Carrier Frequency	TP9 (1.4 MHz) TP10 (1.8 MHz) [0] [2] FM Audio	R85 (L-CH FM CAR) R86 (R-CH FM CAR) [0] [2] FM Audio	—	REC	1. Connect a frequency counter to TP9 and TP10. 2. Adjust R85 so that L-ch frequency is 1.4 MHz ± 50 kHz. 3. Adjust R86 to obtain 1.8 MHz ± 50 kHz of R-ch frequency.
3	A. FM REC Level	TP2 TP26 (GND) [0] [2] FM Audio	R105 (L-CH REC LEVEL) R106 (R-CH REC LEVEL) [0] [2] FM Audio	—	REC	1. Set the oscilloscope as specified below. V : 20 mV/div. H : 0.5 μ s/div. 2. Turn R105 fully clockwise and R106 fully counterclockwise viewed from the parts side. 3. Turn R105 counterclockwise until the 1.3 MHz signal level becomes 34 mV.



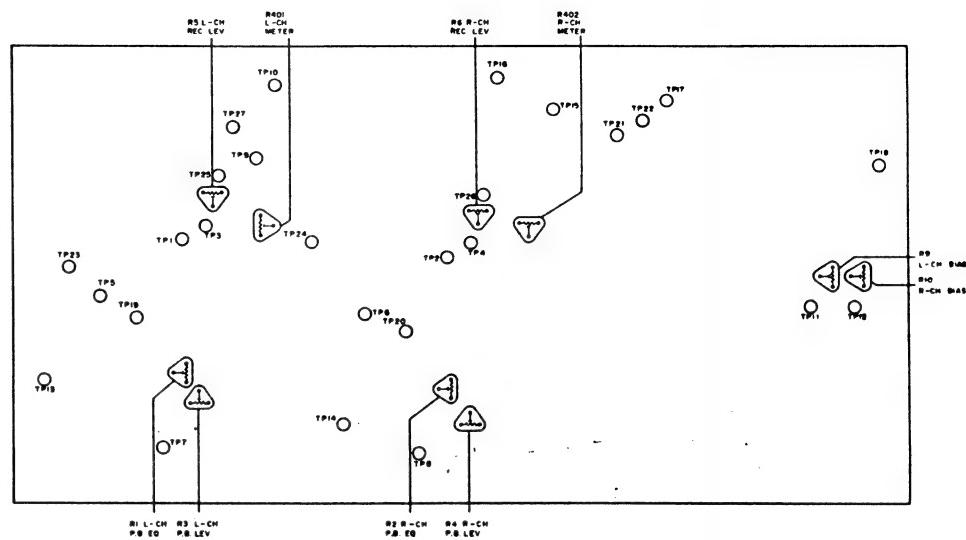
4. Next, turn R106 clockwise until level of mixed waveform (1.3 MHz and 1.7 MHz signals) becomes 110 mV.

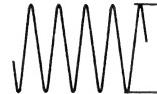
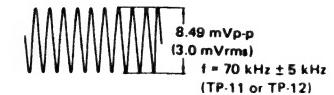


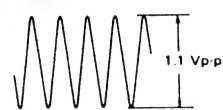
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
4	A. FM P.B. Switching Point	TP16 (FMA) TP17 (FMA) [0] [2] FM Audio D. PULSE	R152 (FMA) R151 (FMA) [0] [2] FM Audio	MH-1 Stairstep	P.B.	<p>1. Connect the oscilloscope's probes to TP16 and TP17. Synchronizing at TP16, observe waveforms at TP16 and TP17 in dual trace mode.</p> <p>2. With the oscilloscope set for \oplus (plus) slope, adjust R152 so that time lag between rise point of TP17 pulse and trailing point of TP16 pulse is 4.7 msec.</p> <p>3. Set the oscilloscope for \ominus (minus) slope and adjust R151 so that time lag between trailing point of TP17 pulse and rise point of TP16 pulse becomes 4.7 msec.</p> <p>This adjustment can be otherwise performed by use of a specified frequency counter for periodicity measurement. (Matsushita's VP-4545A or equivalent)</p>
5	A. FM P.B. Level	Hi-Fi OUT	R95 (L-CH) R96 (R-CH) [0] [2] FM Audio	MH-F8 1 kHz	P.B.	<p>1. Connect the oscilloscope's probe to HiFi LINE OUT terminal and adjust R95 (L-ch) and R96 (R-ch) so that PB level is -6 dBs (1.10 Vp-p) respectively.</p>
6	EXT. Hi-Fi REC LEVER VR	Hi-Fi OUT	REC LEV. VR (Front Panel)	1 kHz -6 dBs (1.1 Vp-p)	E-E	<p>1. Turn the REC LEVEL VR fully clockwise and confirm that output without load is $6.5 - 9.5$ dBs (4.65 - 6.57 Vp-p).</p> <p>2. Turn the REC LEVEL VR again to obtain -6 dBs (1.10 Vp-p) of the output level.</p> <p>Note: For all the following adjustments, keep the VR set to this position.</p>
7	Level Meter	On the Meter	R141 (L-CH) R142 (R-CH) [0] [2] FM Audio	1 kHz -6 dBs (1.1 Vp-p)	E-E	<p>1. Adjust the LEVEL VR so that Hi-Fi OUT level is -6 dBs.</p> <p>2. Adjust R141 (L-ch) and R142 (R-ch) so that the level meter reads 0 dBs respectively.</p> 
8	REC Deviation	Hi-Fi OUT	R81 (L-CH) R82 (R-CH) [0] [2] FM Audio	1 kHz -6 dBs (1.1 Vp-p)	REC \downarrow P.B.	<p>1. Repeat the adjustment of Section 3.6, item No. 5.</p> <p>2. In recording, turn R81 (L-ch DEV).</p> <p>3. Play back the recorded signal to confirm that PB level is -6 dBs.</p> <p>4. If the PB level does not meet the above specification, repeat the steps 2. and 3. until a result is satisfactory.</p> <p>5. In the same manner as above, adjust R82 (R-ch DEV) to obtain -6 dBs PB level.</p>

3.7 AUDIO CIRCUIT

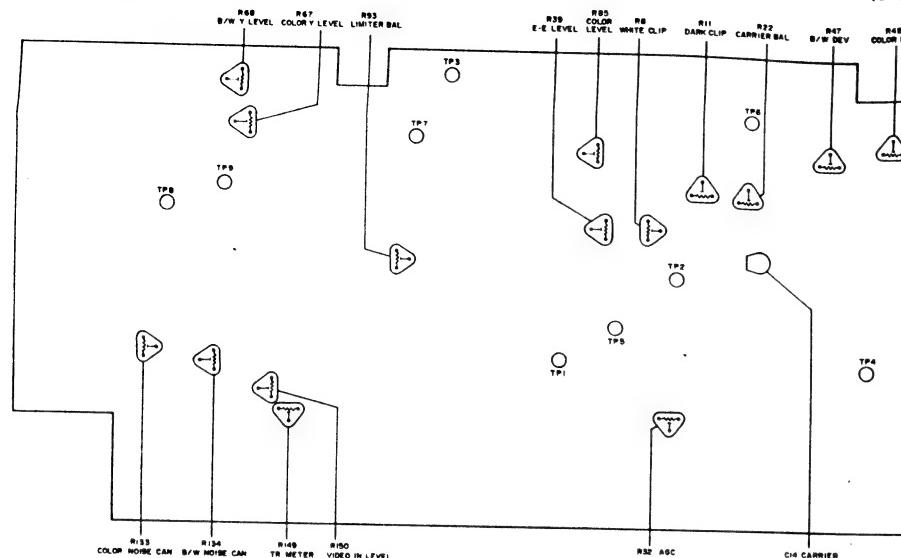
Audio Board Adjustment Point (Top View)



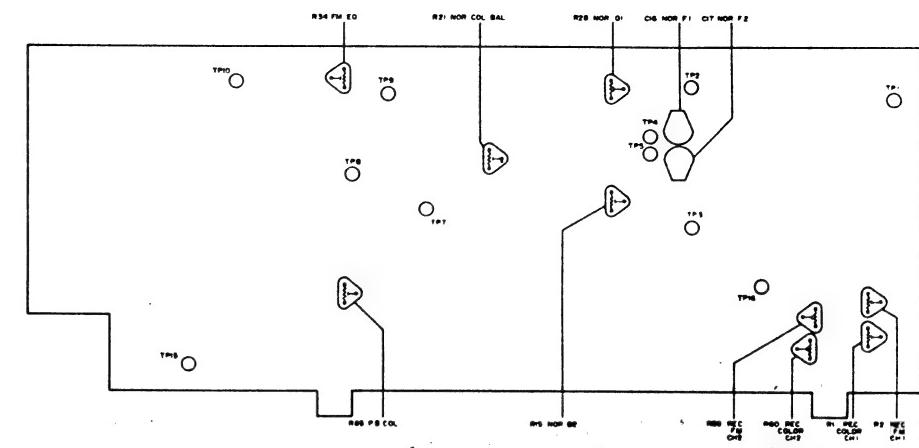
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform								
1.	EXT. NOR. REC LEVEL VR	Normal Audio OUT AUDIO INPUT SELECT SW : SEP AUDIO METER SELECT SW : NORMAL	Normal REC LEVEL VR (Front panel)	1 kHz -6 dBs (1.1 Vp-p)	E-E	<p>1. Confirm the Normal OUT level has no load of 6.5 – 9.5 dBs (4.65 – 6.57 Vp-p) when Normal REC LEVEL VR is turned fully clockwise ().</p> <p>2. Confirm a difference between L-CH and R-CH of within 2 dBs.</p> <p>3. Turn Normal REC LEVEL VR clockwise to obtain -6 dBs (1.1 Vp-p). ( ADJ)</p> <p>Note: Set output levels so that NOR. REC LEVEL VR position becomes the same to this section (3.7.1) for the following items.</p>								
2	LEVEL METER	On the Meter AUDIO INPUT SELECT SW : SEP AUDIO METER SELECT SW : NORMAL	R401 (L-CH) R402 (R-CH) <input checked="" type="checkbox"/> Audio	1 kHz -6 dBs (1.1 Vp-p)	E-E	<p>1. Adjust R401 (L-CH) and R402 (R-CH) of the Audio board to read 0 dB on the level meter.</p> 								
3	Playback Level	NORMAL (L/R) Front Service Terminal <input checked="" type="checkbox"/> Audio NR SW: OFF	R3 (L-CH) R4 (R-CH) <input checked="" type="checkbox"/> Audio	MH-2 1 kHz, 0 dB	P.B.	<p>1. At 1 kHz 0 dB playback, adjust R3 (L-CH P.B. LEVEL) and R4 (R-CH P.B. LEVEL) to obtain audio output levels with no load of -8 dBs (0.88 Vp-p).</p> 								
4	P.B. Frequency Response	NORMAL (L/R) Front Service Terminal NR SW: OFF	R1 (L-CH P.B. EQ) R2 (R-CH P.B. EQ) <input checked="" type="checkbox"/> Audio	MH-8 400 Hz, 100 Hz, 8 kHz -20 dB	P.B.	<p>1. Adjust R1 (L-CH) of the Audio board to obtain the frequency response shown in the Table (at 100 Hz is check only).</p> <p>2. Set the 400 Hz signal for 0 dB reference level.</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level (dB)</th> </tr> </thead> <tbody> <tr> <td>400 Hz</td> <td>0 dB</td> </tr> <tr> <td>100 Hz</td> <td>-0.5 ± 2.0 dB</td> </tr> <tr> <td>8 kHz</td> <td>0 dB</td> </tr> </tbody> </table> <p>3. In the same manner, adjust R2 (R-CH) of the Audio board.</p>	Frequency	Level (dB)	400 Hz	0 dB	100 Hz	-0.5 ± 2.0 dB	8 kHz	0 dB
Frequency	Level (dB)													
400 Hz	0 dB													
100 Hz	-0.5 ± 2.0 dB													
8 kHz	0 dB													
5	Bias Level	TP-5 (L-CH) TP-23(GND) TP-6 (R-CH) TP-24(GND) <input checked="" type="checkbox"/> Audio	R9 (L-CH BIAS) R10 (R-CH BIAS) <input checked="" type="checkbox"/> Audio	-	REC	<p>1. Connect an oscilloscope to TP-5/TP-23 (GND) L-CH or TP-6/TP24 (GND) R-CH of the Audio board.</p> <p>2. Adjust R9 (L-CH BIAS LEVEL) and R10 (R-CH BIAS LEVEL) of the Audio board to set the bias levels for 3.0 mVrms.</p> 								

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform										
6	Audio REC Level	NORMAL (L/R) Front Service Terminal AUDIO INPUT SELECT SW : SEP NR SW: OFF EXT. REC LEV VR  ADJ.	R5 (L-CH) R6 (R-CH) <input checked="" type="checkbox"/> Audio	1 kHz -6 dBs (1.1 Vp-p) to AUDIO IN	REC ↓ P.B.	<p>1. Adjust R5 (L-CH REC LEV) and R6 (R-CH REC LEV) to obtain audio output levels with no load of -6 dBs (1.1 Vp-p).</p>  <p>Note: Confirm that level difference between L-CH and R-CH within 0.5 dB.</p>										
7	REC/P.B. Frequency Response	NORMAL (L/R) Front Service Terminal AUDIO INPUT SELECT SW : SEP NR SW : ON	R7 (L-CH) R8 (R-CH)	1 kHz 8 kHz -26.0 dBs	REC ↓ PB	<p>1. Supply 1 kHz -6 dBs signal to AUDIO IN terminal and confirm that AUDIO OUT level is -6 dBs in E-E mode.</p> <p>2. Supply 1 kHz, 8 kHz -26 dBs signals through AUDIO IN terminal to record and play back.</p> <p>3. Confirm that PB level of 8 kHz signal is 0 ± 0.3 dB as 1 kHz signal level is the reference.</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level (dB)</th> </tr> </thead> <tbody> <tr> <td>8 kHz</td> <td>0.0 ± 0.3 dB</td> </tr> </tbody> </table> <p>4. If not, adjust bias level within 3.6 ± 0.5 mVrms.</p> <p>5. Turn on the NR switch.</p> <p>6. Record 1 kHz, 20 Hz and 100 Hz signals of -26 dBs each, and play them back.</p> <p>7. Confirm that PB level of 20 Hz and 100 Hz signals are as specified below, respectively.</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level (dB)</th> </tr> </thead> <tbody> <tr> <td>20 Hz</td> <td>-5.0 ± 0.5 dB</td> </tr> <tr> <td>100 Hz</td> <td>0.0 ± 3.0 dB</td> </tr> </tbody> </table> <p>8. Record 12 kHz -26 dBs signal and play it back to confirm that its PB level is 0 ± 2.5 dB as 1 kHz signal level is the reference.</p> <p>9. If not, adjust R7 and R8 for both the channels and repeat the step 8. for confirmation of the specified values.</p>	Frequency	Level (dB)	8 kHz	0.0 ± 0.3 dB	Frequency	Level (dB)	20 Hz	-5.0 ± 0.5 dB	100 Hz	0.0 ± 3.0 dB
Frequency	Level (dB)															
8 kHz	0.0 ± 0.3 dB															
Frequency	Level (dB)															
20 Hz	-5.0 ± 0.5 dB															
100 Hz	0.0 ± 3.0 dB															
8	Distortion	NORMAL OUT AUDIO INPUT SELECT SW : SEP NR SW : ON	-	1 kHz -2 dBs (1.56 Vp-p)	REC ↓ P.B.	1. Confirm that the distortion is less than 3.0%.										

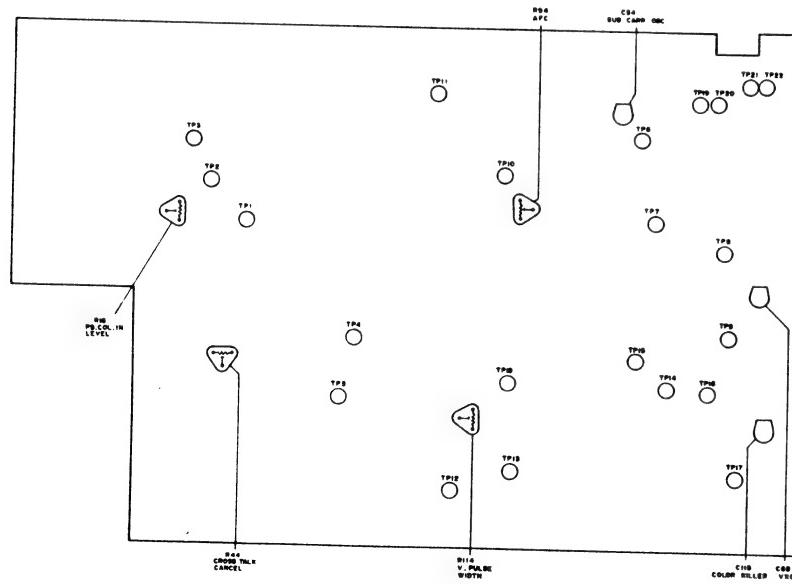
Y Amp. Board Adjustment Point (Bottom View)

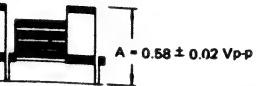
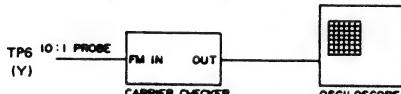
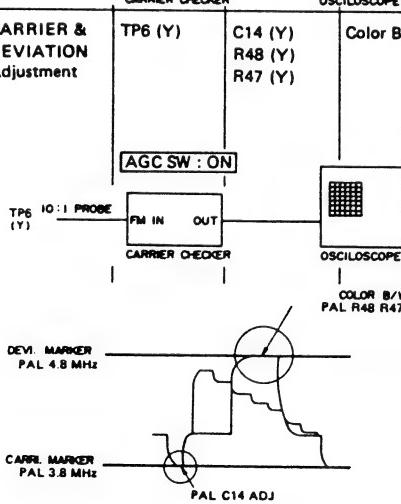


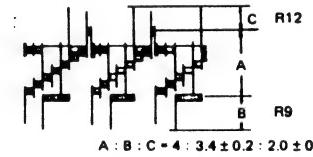
PRE/REC Board Adjustment Point (Bottom View)



Color Board Adjustment Point (Top View)



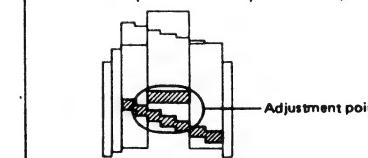
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
1	AGC	TP4 <input checked="" type="checkbox"/> Y Amp. AGC SW : ON	R32 (AGC LEVEL) <input checked="" type="checkbox"/> Y Amp.	Color Bar	E-E	<p>1. Supply a color bar signal to VIDEO IN.</p> <p>2. Connect the oscilloscope to TP4 of Y Amp. board.</p> <p>3. Adjust R32 (AGC LEVEL SET) of the Y Amp. board to obtain 0.58 ± 0.02 Vp-p.</p> 
2	Carrier Bal.	TP6 (Y) <input checked="" type="checkbox"/> Y Amp.	R22 (CAR. BAL.) <input checked="" type="checkbox"/> Y Amp.	-	E-E	<p>1. In the E-E mode, without an input signal.</p> <p>2. Connect the carrier checker and oscilloscope as shown in the figure.</p> <p>3. Set the carrier checker to the NORMAL VHS mode at carrier Bal. mode.</p> <p>4. Adjust R22 (CARRIER BAL.) of the Y Amp. board to minimum level.</p> 
3	CARRIER & DEVIATION Adjustment	TP6 (Y) AGC SW : ON	C14 (Y) R48 (Y) R47 (Y)	Color Bar	E-E	<p>1. In the E-E mode input the color bars signal through the VIDEO IN terminal.</p> <p>2. Connect the carrier checker and oscilloscope as shown in the figure.</p> <p>3. Set the carrier checker to the NORMAL VHS mode.</p> <p>4. Adjust C14 so that sync tip of the waveform coincides with the lower base line of the oscilloscope screen.</p> <p>5. Adjust R48 so that white peak coincides with the upper base line of the oscilloscope screen.</p> <p>6. Make a shortcircuit between TP21 and GND of the color board.</p> <p>7. Adjust R47 so that white peak coincides with the oscilloscope's upper base line.</p> <p>8. Disconnect the shorting wire between TP21 and GND.</p> <p>Note: For the measurement, use a probe of 10 : 1 ratio.</p> 
4	AFC	TP-10 <input checked="" type="checkbox"/> Color	R94 (AFC) <input checked="" type="checkbox"/> Color	Color Bar	REC ↓ P.B.	<p>1. Connect a video monitor to the VIDEO OUT terminal.</p> <p>2. Record the color bars signal and play it back.</p> <p>3. Connect a digital voltmeter to TP10 of the COLOR board.</p> <p>4. Adjust R94 of the COLOR board so that signal level at TP10 is 4.40 ± 0.05 V DC in the range of normal color reproduction on the video monitor.</p>

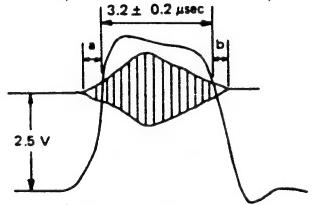
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
5	VXO	TP-8 <input checked="" type="checkbox"/> Color	C68 (VXO) TP-7 <input checked="" type="checkbox"/> Color	Color Bar	E-E	<p>1. Supply a color bar input signal to VIDEO IN.</p> <p>2. Connect a jumper wire between TP-7 of the Color board and GND.</p> <p>3. Connect a frequency counter to TP8 of the Color board.</p> <p>4. Adjust C68 (VXO) of the Color board to obtain 4.435571 MHz ± 30 Hz.</p> <p>Note: For the measurement, use a probe of 10 : 1 ratio.</p>
6	E-E Y Level	TP-8 <input checked="" type="checkbox"/> Y Amp.	R39 (E-E LEVEL) <input checked="" type="checkbox"/> Y Amp.	Color Bar	E-E	<p>1. Supply a color bar input signal to VIDEO IN.</p> <p>2. With load at 75-ohm, connect the oscilloscope to TP-8 (VIDEO OUT) of the Y Amp. board.</p> <p>3. Adjust R39 (E-E LEVEL) of the Y Amp. board to obtain 1.0 ± 0.02 Vp-p.</p> 
7	White and Dark Clip	TP-2 <input checked="" type="checkbox"/> Y Amp.	R8 (WHITE) CLIP R11 (DARK CLIP) <input checked="" type="checkbox"/> Y Amp.	Color Bar	E-E	<p>1. Supply a color bar signal to VIDEO IN.</p> <p>2. Connect the oscilloscope to TP-2 of the Y Amp. board.</p> <p>3. As shown in the Figure adjust R8 (WHITE CLIP) and R11 (DARK CLIP).</p> 
8	P.B. Y Level	VIDEO OUT (TP5) <input checked="" type="checkbox"/> Y Amp.	R68 (P.B. Y LEVEL) <input checked="" type="checkbox"/> Y Amp.	Color Bar	REC ↓ P.B.	<p>1. Supply a color bar signal to VIDEO IN.</p> <p>2. With load at 75Ω, connect the oscilloscope to VIDEO OUT (TP5) of the Y Amp. board.</p> <p>3. Connect a jumper wire between TP21 of the color board and GND.</p> <p>4. Adjust R68 (P.B. Y LEVEL) of the Y. Amp. board to obtain 1.0 ± 0.02 Vp-p.</p> 
9	V. Pulse Width	TP-13 <input checked="" type="checkbox"/> Color	R114 <input checked="" type="checkbox"/> Color	MH-2 Color Bar	P.B.	<p>1. Connect the oscilloscope's probe to TP13 of the COLOR board.</p> <p>2. Play back the alignment tape MH-2 and confirm that the pulse duration meets the following specifications.</p> <p>$T = 580 \pm 20$ μsec.</p> <p>3. If not, adjust R114 of the COLOR board to obtain the specified value.</p>

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
10	REC FM Level	TP-2 (CH-1) TP-3 (CH-2) [0] 9 Pre/Rec. D. PULSE Front Service Terminal	R2 (CH-1) REC FM R59 (CH-2) REC FM [0] 9 Pre/Rec.	Color Bar	REC REC ↓ P.B. REC REC ↓ P.B.	<p>1. Supply a color bar signal to VIDEO IN.</p> <p>2. Connect an oscilloscope to TP-2 (CH-1) and TP-3 (CH-2) of the Pre/Rec. board and trigger the oscilloscope externally with the signal from D. PULSE terminal.</p> <p>3. Adjust R2 (CH-1 REC FM LEV.) and R59 (CH-2 REC FM LEV.) to obtain 50 mVp-p.</p> <p>4. Connect an oscilloscope to TP7 of the FM audio board and record then play back. Confirm the TP7 (CH-1/CH-2) level is more than 76 mVp-p (trigger : - slope CH-1, + slope CH-2).</p> <p>5. If TP7 level is less than 76 mVp-p, readjust R2 or R59.</p> <ul style="list-style-type: none"> • When CH-1 level is less than 76 mVp-p, readjust R59 (CH-2 REC FM LEV.) to obtain 45 mVp-p. • When CH-2 level is less than 76 mVp-p, readjust R2 (CH-1 REC FM LEV.) to obtain 45 mVp-p. <p>6. Confirm the TP7 level is more than 76 mVp-p.</p> <p>7. If TP7 level is less than 76 mVp-p, readjust R2 and R59 to obtain 40 mVp-p in the same manner as above step 5.</p> <p>8. Confirm the TP7 level is more than 76 mVp-p.</p>
11	Video Head Resonance and Q (Quality Factor) (Using signal generator)	TP8 (PRE/REC) SWEEP IN TP2 (CH-1) TP3 (CH-2)	C16 (PRE/REC) C17 (PRE/REC) R28 (PRE/REC) R15 (PRE/REC)	P.B.		<p>1. Connect the oscilloscope to TP8 of the PRE/REC board.</p> <p>2. Connect a sweep generator to TP2 (CH-1) of the PRE/REC board to supply sweep signal through it.</p> <p>3. Set the deck with a blank tape. Set for Play mode.</p> <p>4. Adjust C16 so that Fo is 4.8 MHz.</p> <p>5. Set the oscilloscope so that 100 kHz signal level is 2 scale divisions on the screen, and adjust R28 to obtain 5.2 scale divisions for Q of 4.8 MHz signal.</p> <p>6. For CH-2, connect the sweep generator to TP3 (CH-2) and perform the same adjustment as mentioned above for CH-1.</p> <p>Notes:</p> <p>Adjustment of this item, is required after replacement of the drum ass'y and upper drum ass'y.</p> <p>Adjust output level of the sweep generator to be 0.25 Vp-p approx. at TP8 with 1 MHz signal.</p> <p>If trigger output is available from the sweep generator, supply the trigger pulse to the oscilloscope for adjustment.</p>

	Sig. IN	Fo	Q
CH-1	TP2	C16	R28
CH-2	TP3	C17	R15

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
12	P.B. Color Channel Balance and Level	TP-15 [0] 9 Pre/Rec. D. PULSE Front Service Terminal	R21 (NOR COL. BAL.) R85 (P.B. COL.) [0] 9 Pre/Rec.	MH-2 Color Bar	P.B.	<p>1. Play JVC Alignment tape MH-2 color signal.</p> <p>2. Connect the oscilloscope to TP-15 of the Pre/Rec. board.</p> <p>3. Trigger the oscilloscope externally with the signal from D. PULSE terminal.</p> <p>4. Adjust R21 (NOR COLOR BAL) of the Pre/Rec. board to align the CH-1 and CH-2 levels.</p> <p>5. Adjust R85 (P.B. LEVEL) of the Pre/Rec. board for a waveform level of 0.5 Vp-p.</p> <p>6. Connect the oscilloscope to TP-2 of the Color board.</p> <p>7. Adjust R18 (P.B. COL IN LEV.) of the Color board for a waveform level of 0.2 Vp-p.</p>
13	P.B. FM Equalizer Channel Balance and level	TP-7, TP-10 [0] 9 Pre/Rec.	R34 (FM EQ) L10 [0] 9 Pre/Rec.		P.B.	<p>1. Supply a sweep signal of approx. 0.5 Vp-p to TP-7 and connect an oscilloscope to TP-10.</p> <p>2. Adjust R34 (FM EQ) to obtain maximum Q at TP-10. ($Fo = 4.2 \pm 0.1$ MHz)</p> <p>3. Confirm resonance frequency differs, adjust by L10.</p>
		VIDEO OUT Both ends 75 Ω load D. PULSE Front Service Terminal	R34 (FM EQ) R28 (NOR Q1) R15 (NOR Q2) [0] 9 Pre/Rec.	Color sweep	REC ↓ P.B.	<p>1. Supply a color sweep signal to VIDEO IN, record and play back.</p> <p>2. With load at 75 Ω, connect oscilloscope to the VIDEO OUT.</p> <p>3. Trigger the oscilloscope externally (- slope CH-1, + slope CH-2) with the signal from D. PULSE of the Front Service terminal.</p> <p>4. If the 2.5 MHz levels of CH-1 and CH-2 differ, adjust the higher level channel to match the lower by using R28 (NOR Q1) for CH-1 and R15 (NOR Q2) for CH-2.</p> <p>5. Use the controls of the oscilloscope to position the 100 kHz region at scale graduation 5 of the oscilloscope screen. Adjust R34 (FM EQ) of Pre/Rec. board to position the 2.5 MHz portion at 3.2 (-4.0 dB) of the oscilloscope gradations.</p>
14	Limiter Balance	TP-7 Y Amp. D. PULSE Front Service Terminal	R93 (LIMITER BAL.) [1] 1 Y Amp.	Color Bar	REC ↓ P.B.	<p>1. Supply a color bar signal to VIDEO IN, record and play back.</p> <p>2. Connect the oscilloscope to TP-7 of the Y Amp. board.</p> <p>3. Trigger the oscilloscope externally with the signal from D. PULSE terminal.</p> <p>4. Adjust R93 (LIMITER BAL.) of the Y Amp. board so that the double line become minimum carrier signal leakage at waveform as shown below.</p>



No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
15	P.B. 4.43 MHz (Sub. Carrier Osc.)	TP-6 ①① Color	C54 (4.43 MHz OSC.) ①① Color	Color Bar	REC	1. Supply a color bar signal to VIDEO IN. 2. Connect a frequency counter to TP-6 of the Color board. 3. Adjust C54 of the Color board to obtain 4.433619 MHz ± 15 Hz.
16	Burst Gate Pulse	TP-4 TP-11 ①① Color	L17 L19 ①① Color	Color Bar	REC ↓ P.B.	1. Supply a color bar input signal to VIDEO IN, record then playback. 2. Connect a dual trace oscilloscope to TP-4 and TP-11 of the Color board. 3. Adjust in the core of L19 and confirm the burst gate pulse width of $3.2 \pm 0.2 \mu\text{sec}$ at DC voltage of 2.5 V. Note: Treat L19 coil carefully as easily broken. 4. Adjust L17 to position the burst gate pulse signal to the center of the burst signal at DC voltage of 2.5 V. (i.e. set to obtain a=b)
						
17	Rec. Color Channel Balance and Level	TP-15 ①⑨ Pre/Rec. D. PULSE Front Service Terminal	R1 (CH-1 REC COL.) R60 (CH-2 REC COL.) ①⑨ Pre/Rec.	Color Bar	REC ↓ P.B.	1. Supply a color bar signal to VIDEO IN, record then playback. 2. Connect the oscilloscope to TP-6 of the Pre/Rec. board. 3. Trigger the oscilloscope externally (- slope CH-1, + slope CH-2) with the signal from D. PULSE of the Front Service terminal. 4. Adjust R1 (CH-1 REC COL.) for CH-1 and R60 (CH-2 REC COL.) for CH-2 to obtain output level of $0.48 \pm 0.02 \text{ Vp-p}$.
						
18	P.B. Color Level	TP-5 ①① Y Amp.	R67 (COL. Y LEV.) R85 (COLOR LEV.) ①① Y Amp.	Color Bar	REC ↓ P.B.	1. Supply a color bar input signal to VIDEO IN, record then play back. 2. With load at 75Ω , connect the oscilloscope to TP-5 of the Y Amp. board. 3. Adjust R67 (COL. Y LEV.) of the Y Amp. board to obtain $1.00 \pm 0.02 \text{ Vp-p}$. 4. Adjust R85 (COLOR LEV.) of the Y Amp. board for $0.28 \pm 0.01 \text{ Vp-p}$ of burst signal.
						

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description and Waveform
19	Color Killer	TP-16 ①① Color	C118 (COL. KILLER) ①① Color	-	E-E	1. Connect jumper wires between TP-14, TP-15 and GND of the Color board. 2. Connect a frequency counter to TP-16 of the Color board and adjust C118 (COL. KILLER) of the Color board to obtain 4.433619 MHz ± 50 kHz.
20	COMB. Filter ADJ.	VIDEO OUT Monitor TV (75 termination)	R44 (CROSS TALK CAN.) L7 ①① Color	Color bar	REC ↓ P.B.	1. Supply a color bar input signal to VIDEO IN, record then playback. 2. Turn the tracking control VR and set for the bar noise becomes located in the most visible position on a monitor display. 3. Adjust R44 (CROSS TALK CAN.) of the Color board for absence of 2H bar noise in the reproduced picture. 4. If not absence of 2H bar noise, alternately adjust L7 and R44 (CROSS TALK CAN.) of the Color board for absence of 2H bar noise.
21	Noise Cancel	TP-9 ①① Y Amp.	R133 (COL. NOISE CAN.) R134 (B/W NOISE CAN.) ①① Y Amp.	Color Bar	REC ↓ P.B.	1. Connect a 0.022 F ceramic capacitor between TP-9 of the Y Amp. board and GND. 2. Connect oscilloscope to TP-9 of the Y Amp. board. 3. Adjust R133 (COL. NOISE CAN.) of the Y Amp. board to minimize the waveform. 4. Connect a 0.022F capacitor between TP21 of the COLOR board and GND. 5. Record then playback. 6. Adjust R134 (B/W NOISE CAN.) of the Y Amp. board to minimize the waveform.
22	Tracking Meter	On the Meter	R149 (TR. METER) ①① Y Amp.	Color Bar	REC ↓ P.B.	1. Supply a color bar input signal to VIDEO IN, record then play back. 2. Turn the tracking control and set it at the center click position. 3. Adjust R149 to read 3.5 on the tracking meter.
23	Video Level Meter	Video Level Meter VIDEO AGC SW : ON	R150 (V. LEV METER) ①① Y Amp.	Color Bar	E-E	1. Supply a color input signal to VIDEO IN. 2. Adjust R150 to get a video meter needle position of the center of the green zone of the meter.

SECTION 4 CHARTS AND DIAGRAMS

4.1 KEY TO ABBREVIATIONS

A	ACC	: Automatic Color Control
	ADD	: Adder
	ADC	: Analog to Digital Converter
	ADJ	: Adjustment
	A DUB	: Audio Dubbing
	AE	: Audio Erase
	AEF	: Automatic Edition Function
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AGC	: Automatic Gain Control
	AH	: Audio Head
	AL	: After Loading
	ALC	: Automatic Level Control
	ALM	: Alarm
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Phase Control
	APL	: Average Picture Level
	ASSEM	: Assembly
	ASS'Y	: Assembly
	ATT	: Attenuator
	AUTO	: Automatic
	AUX	: Auxiliary
	AUD	: Audio

B	B	: Brake
	BAL	: Balance
	BATT	: Battery
	BCD	: Binary Coded Decimal
	BEG	: Beginning
	BFP	: Burst Flag Pulse
	BIT	: Binary Digit
	BLK	: Black
	BLU	: Blue
	BNC	: Bayonet connector
	BPF	: Bandpass Filter
	BRN	: Brown
	BRT	: Brightness
	B. SOL	: Brake Solenoid
	B/W	: Black and White

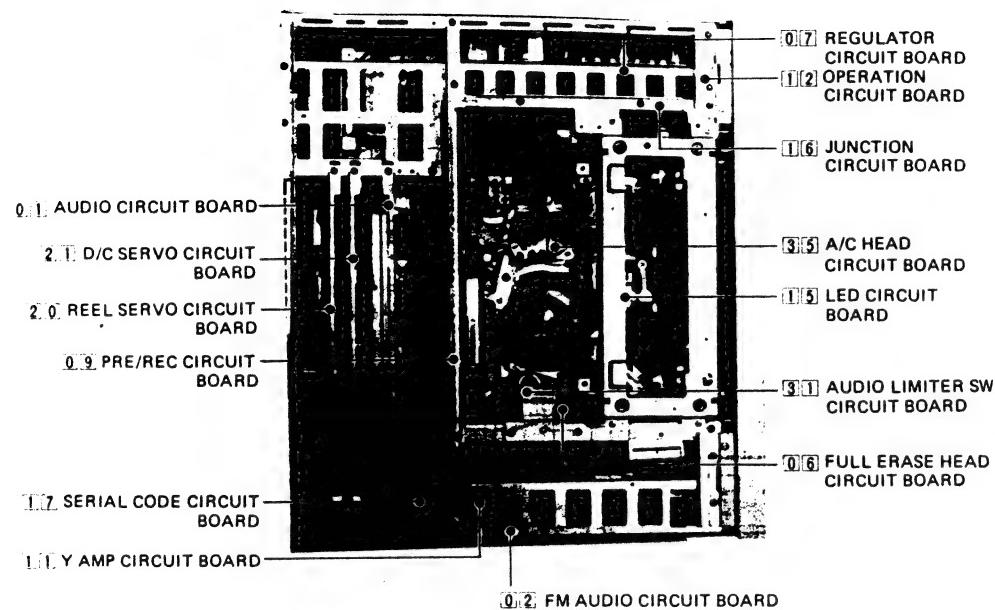
C	C	: Ceramic
	CAP	: Capstan
	CASS	: Cassette
	CF	: Ceramic Filter, color Frame
	CC	: Cassette compartment
	CE	: Chip Enable
	CH	: Channel
	CHROMA	: Chrominance
	CLK	: Clock
	CLR	: Clear
	CMD	: Command
	CNT	: Count, Counter
	CONV	: Converter
	COL	: Color
	COM	: Common

COMP	: Comparator
	Composite
	Compensation
CONN	: Connector
CT	: Ceramic Trap
CTC	: Crosstalk Cancel
CTL	: Control
D	D : Drum
	DAC : Digital to Analog Converter
	DD : Direct Drive
	DEC : Decoder
	DEMOD : Demodulator
	DET : Detector
	DEV : Deviation
	DFRS : Drum Free RUN STOP
	DIF TRANS : Differential Transformer
	DISCR : Discriminator
	DL : Delay Line
	DOC : Dropout Compensator
	DRUM FF : Drum Flip Flop
	DUB : Dubbing
E	E : Edit, Erase
	EDP : Electronic Data Processing
	E-E : Electric to Electric
	EF : Emitter-Follower
	EMPHA : Emphasis
	EMG : Emergency
	ENC : Encoder
	EN : Enable
	EQ : Equalizer
	ESNS : End Sensor
	EXP : Expander
	EXT : External
F	FE : Full Erase
	FF : Fast Forward
	FG : Flipflop
	FG : Frequency Generator
	FM : Frequency Modulation
	FMA : FM Audio
	FREQ : Frequency
	F-V CONV : Frequency to Voltage Converter
	FWD : Forward
G	GDL : Grass Delay Line
	GEN LOCK : Generator Lock
	GND : Ground
	GRN : Green
	GRY : Gray
H	H : High, Horizontal
	HG : Hall Generator
	HPF : Highpass Filter
I	IF : Intermediate Frequency
	IFT : Intermediate Frequency Transformer
	IND : Indicator
	INH : Inhibit
	INS : Insert

INT	: Internal, Interrupt
INV	: Inverter
I/O	: Input/Output
L	L : Low
	LB : Low Band
	LCD : Liquid Crystal Display
	LE : Loading End
	LED : Light Emitting Diode
	LIN : Linearity
	LIM : Limiter
	LOAD : Loading
	LP : Long Play
	LPF : Lowpass Filter
	LT : Loading Tension
M	MAX : Maximum
	MDA : Motor Drive Amplifier
	MIC : Microphone
	MIN : Minimum
	MIX : Mixer
	MM : Monostable Multivibrator
	MOD : Modulator
	MON : Monitor
	MOS : Metal Oxide Semkonductor
	MPX : Multiplexer
	MS : Mode Select
	MUT : Muting
N	NC : Noise Cancel
	NFB : Negative Feedback
	NO : Normally Open
O	OPAMP : Operational Amplifier
	OP : Operation
	ORN : Orange
	OSC : Oscillator
P	PB : Playback
	PC : Photocoupler
	PCM : Pulse Code Modulation
	PGM : Program
	PG : Pulse Generator
	PI : Photo Interrupter
	PLL : Phase Locked Loop
	POS : Position
	PR : Pinch Roller
	PREV : Preview
	PRL : Preroll
	PU : Pickup
	PWB : Printed Wiring Board
Q	Q : Quality Factor
R	RA : Resistor Array
	RAM : Random Access
	REC : Recording
	REG : Regulated
	REV : Reverse
	REW : Rewind
	RF : Radio Frequency

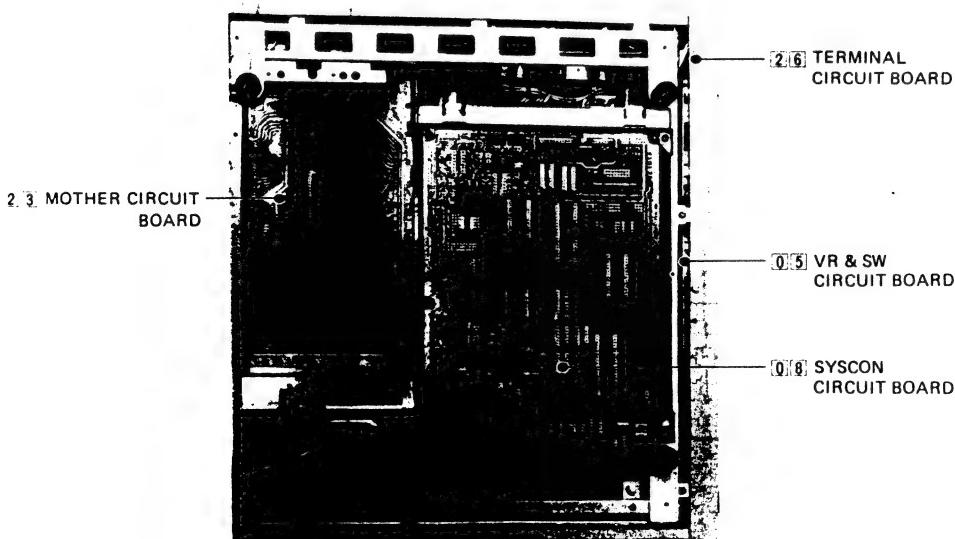
RST	: Reset
R/P	: Record/Playback
RPT	: Repeat
RT	: Rotary Transformer
RY	: Relay
S	S : Search, Servo
	SC : Subcarrier
	SEAR : Search
	SEL : Select
	SENS : Sensor
	SEP : Separator
	SF : Source Follower
	SFF : Short Fast Forward
	SFWD : Search Forward
	SI : Serial In
	SIG : Signal
	SO : Serial Out
	SOL : Solenoid
	SOS : Sound on Sound
	SP : Standard Play
	SR : Supply Reel
	SREV : Search Reverse
	SREW : Short Rewind
	SSG : Sync Signal Generator
	STL : Still
	SUP : Supply
	SYNC : Synchronization
	SYSCON : System control
T	TBC : Time Base Corrector
	TC : Tension Control, Time Code
	TDG : Time Date Generator
	T. EALM : Tape End Alarm
	TEN : Tension
	TIM : Timing
	TK : Tracking
	TL : Time Lapse
	TREC : Timer Record
	TSW : Time Switch
	TU : Take-up
	TUR : Take-up Reel
U	UNLD : Unloading
	UNREG : Unregulated
	UNSW : Unswitched
V	V : Video, Vertical
	VCO : Voltage Controlled Oscillator
	VD : Vertical Drive
	VXO : Variable Crystal Oscillator
	VLT : Violet
	VSCH : Variable Search
W	WHT : White
	WV : Working Voltage
	WARN : Warning
X	XTL : Crystal
Y	Y : Luminance
	YLW : Yellow

4.2 ELECTRICAL PARTS LOCATION

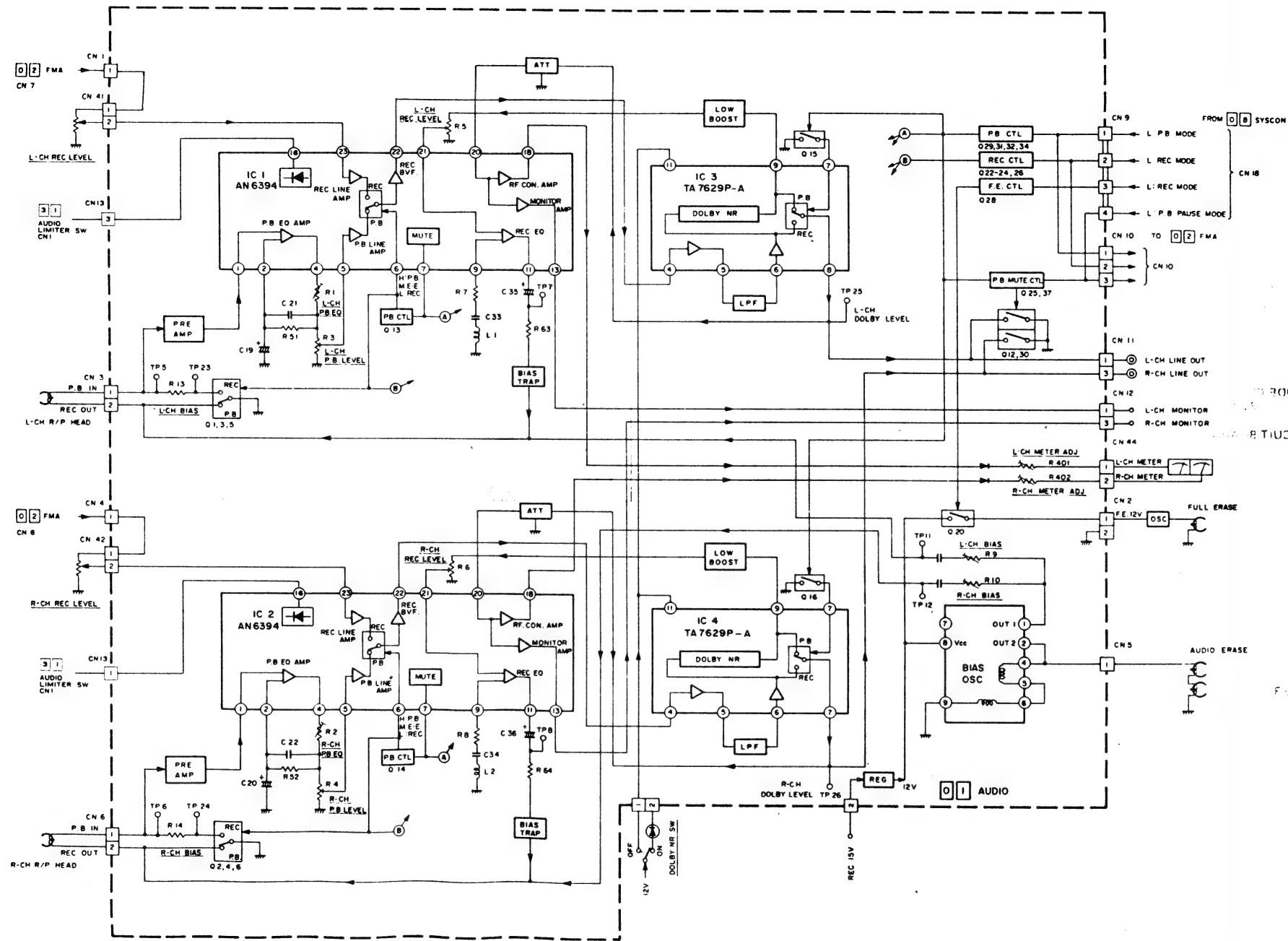


- INDEX OF CHARTS, DIAGRAMS AND PARTS LIST -

No.	CIRCUIT BOARD NAME	Block diagram page	Schematic diagram page	Circuit board page	Parts list page
0.1	AUDIO	4-4	4-12	4-13	6-6
0.2	FM AUDIO	4-5	4-14	4-15	6-8
0.3	REAR-1	-	4-38	4-34	6-12
0.4	REAR-2	-	4-38	4-34	6-12
0.5	VR & SW	-	4-38	4-34	6-12
0.6	FULL ERASE HEAD	--	4-38	4-36	6-12
0.7	REGULATOR	--	4-16	4-17	6-12
0.8	SYSTEM CONTROL	4-11	4-18	4-19	6-13
0.9	PRE/REC	4-6	4-20	4-21	6-15
1.0	COLOR	4-7	4-22	4-23	6-17
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1.3	END SENSOR	--	4-39	4-35	6-23
1.5	LED	--	4-39	4-35	6-23
1.6	JUNCTION	--	4-26	4-27	6-24
1.7	SERIAL CODE	--	4-28	4-29	6-24
1.8	CASSETTE HOUSING	--	4-39	4-35	6-24
2.0	REEL SERVO	4-9	4-30	4-31	6-24
2.1	D/C SERVO	4-10	4-32	4-33	6-26
2.3	MOTHER	--	--	4-37	6-28
2.4	FRONT LED	--	4-39	4-35	6-28
2.5	REC LED	--	4-39	4-35	6-28
2.6	TERMINAL	--	4-38	4-35	6-28
2.7	LD/UNLD SW	--	--	4-36	--
3.1	AUDIO LIMITER SW	--	4-38	4-36	6-28
3.5	A/C HEAD	--	4-38	4-36	6-28
4.1	POWER TRANSISTOR	--	4-16	4-17	6-28



4.3 AUDIO BLOCK DIAGRAM

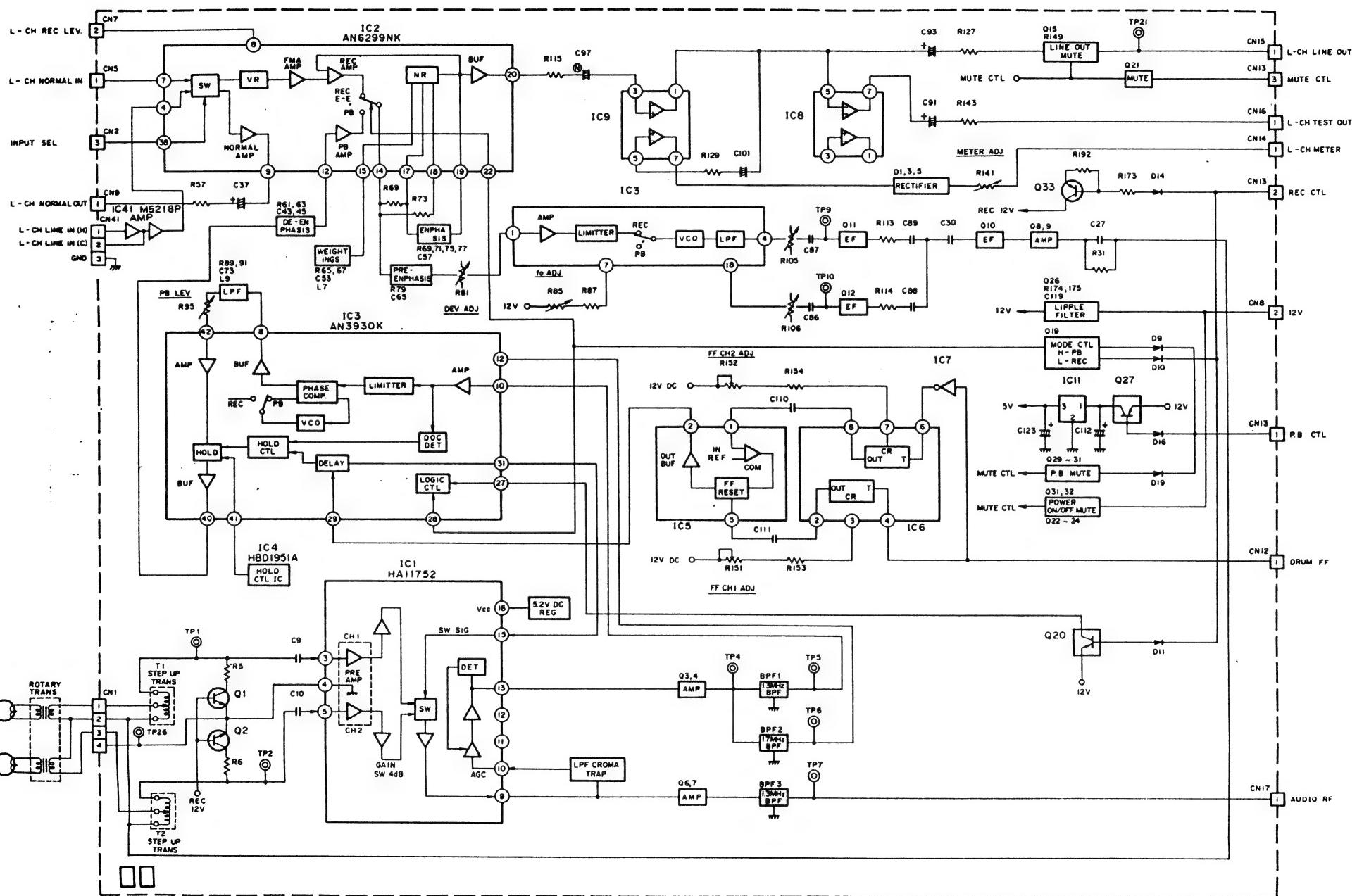


A B C D E F G H

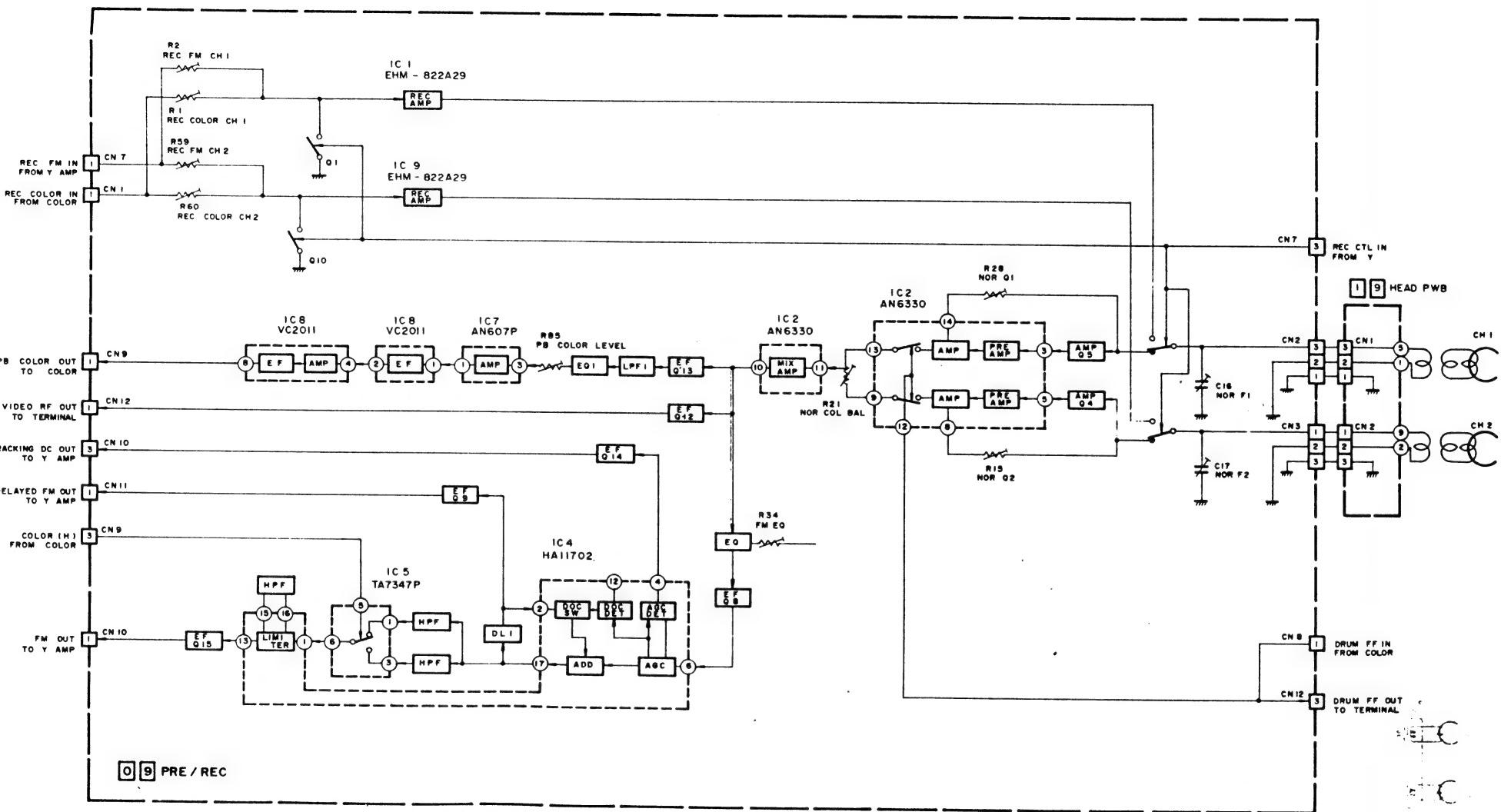
AUDIO BLOCK 4-4

AUDIO BLOCK 4-4

4.4 FM AUDIO BLOCK DIAGRAM



4.5 VIDEO SECTION BLOCK DIAGRAM (PRE/REC)



VIDEO BLOCK 4

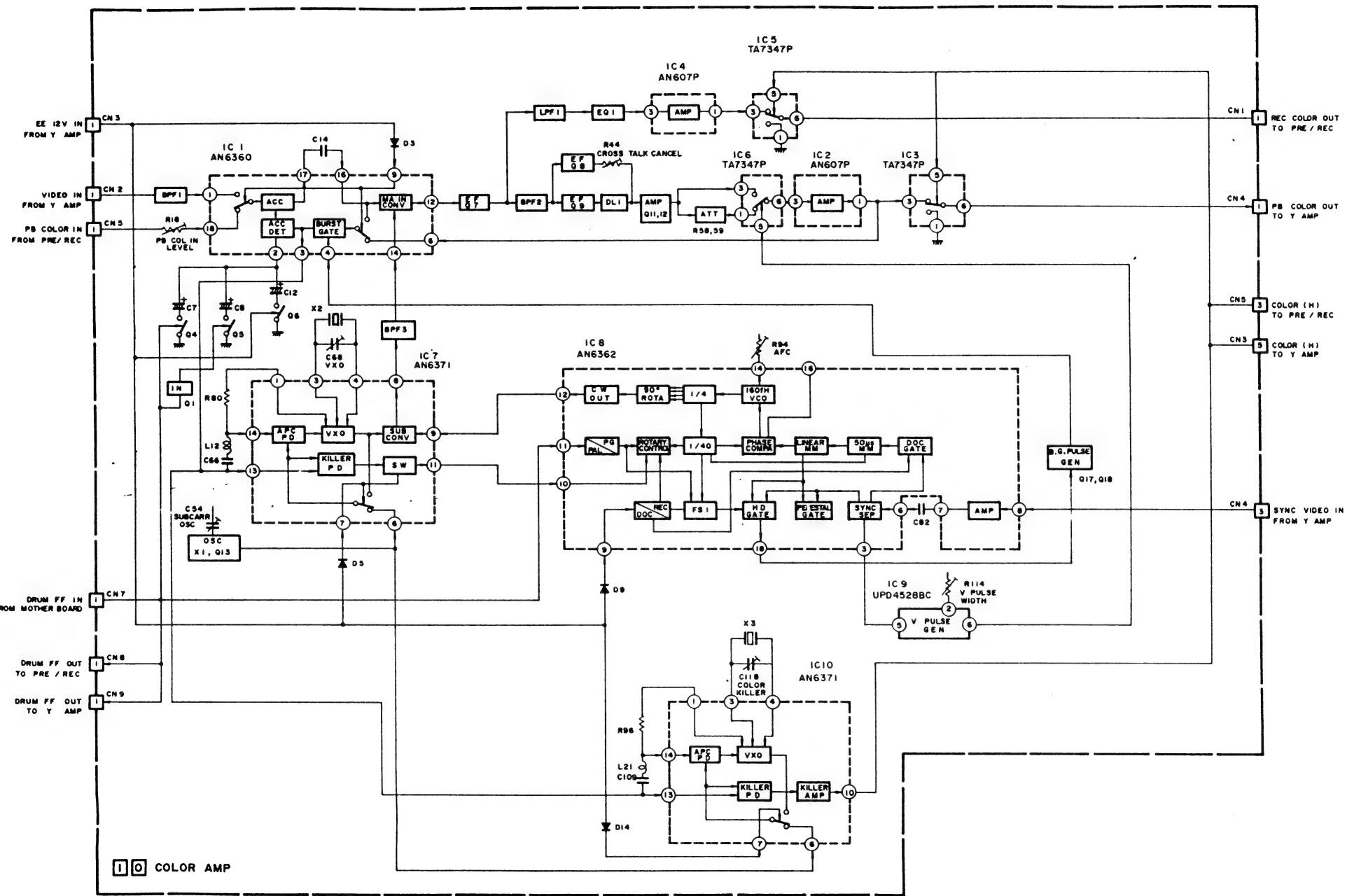
4-6 VIDEO BLOG

1

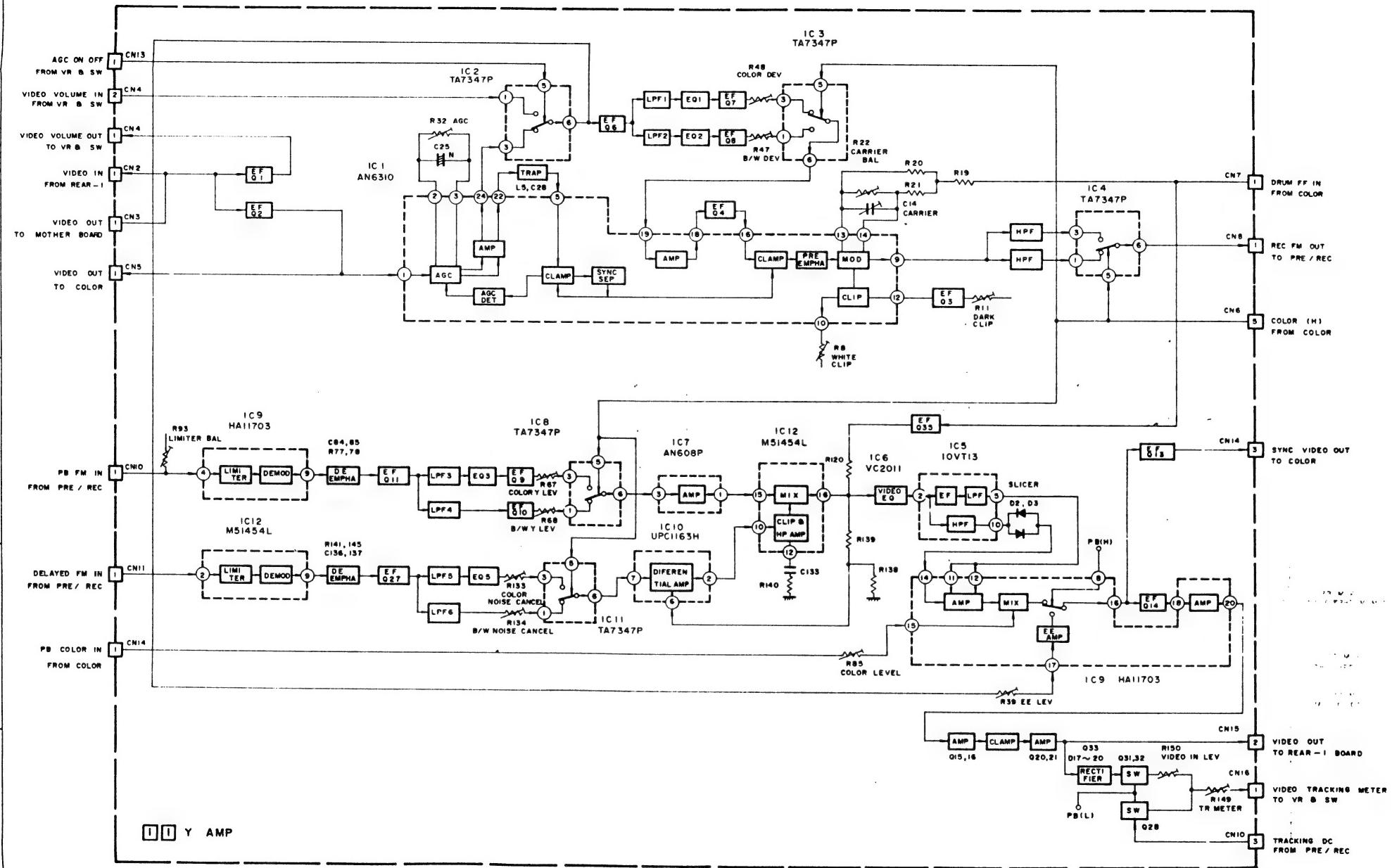
4

1

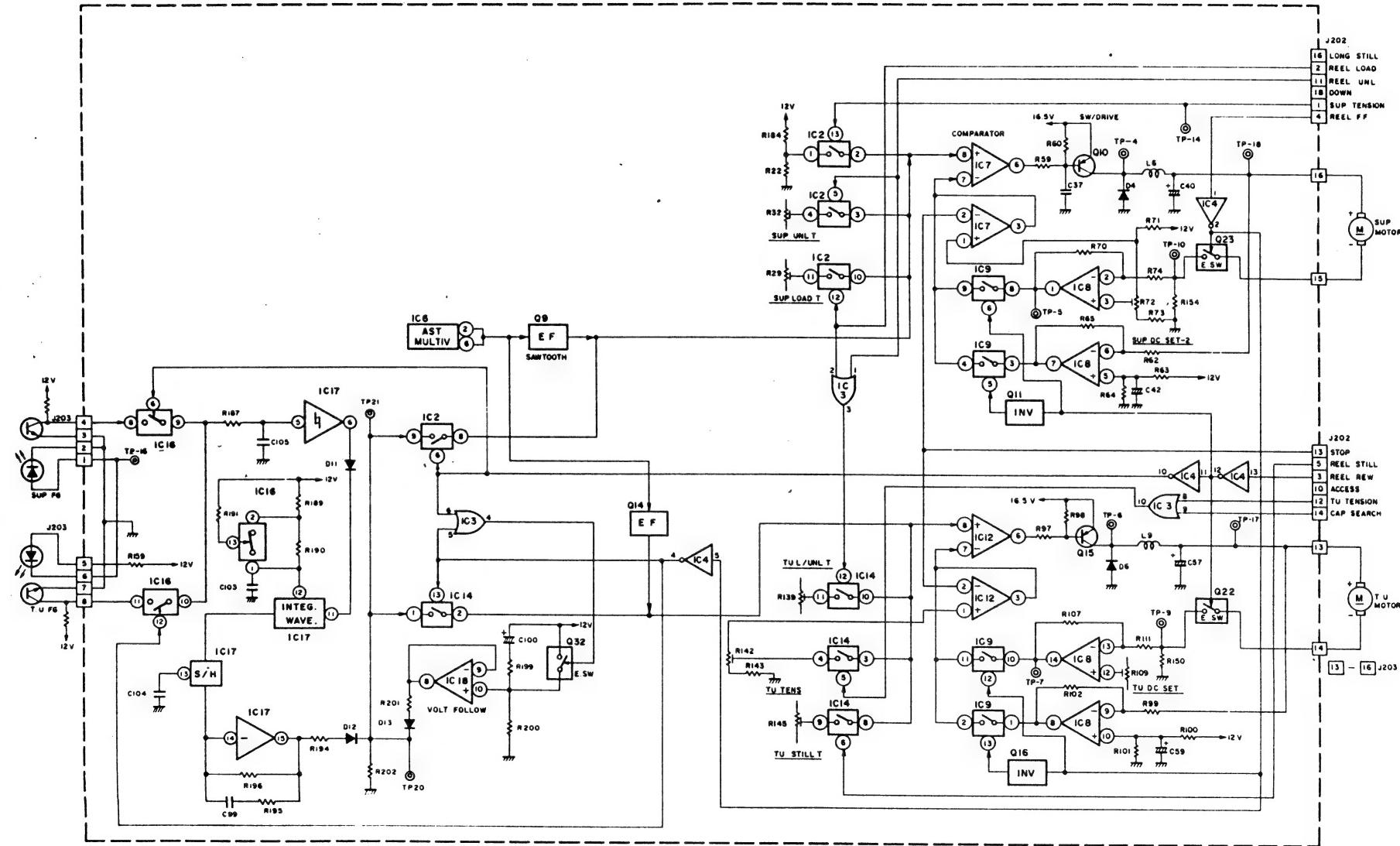
4.6 VIDEO SECTION BLOCK DIAGRAM (COLOR)



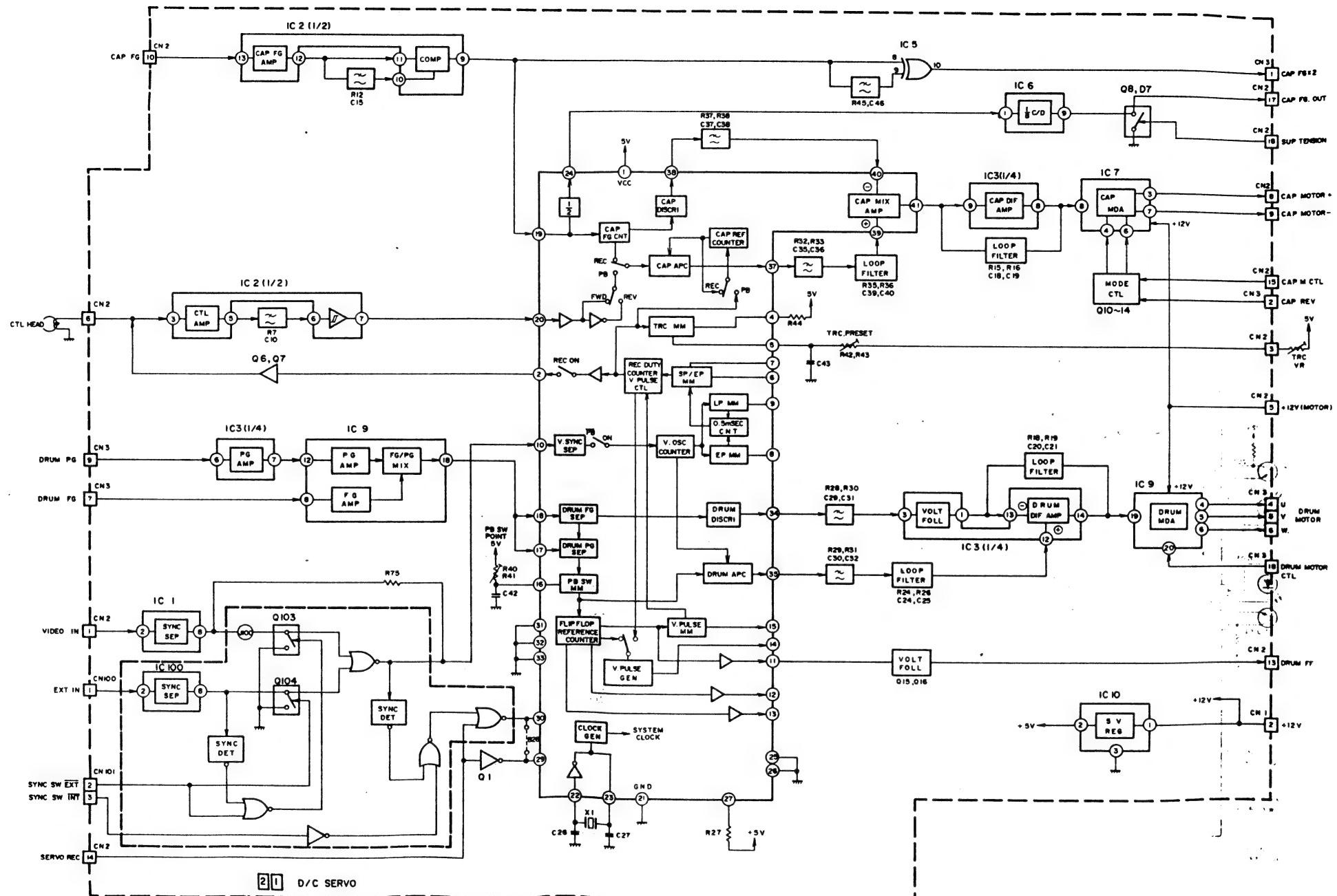
4.7 VIDEO SECTION BLOCK DIAGRAM (Y AMP)



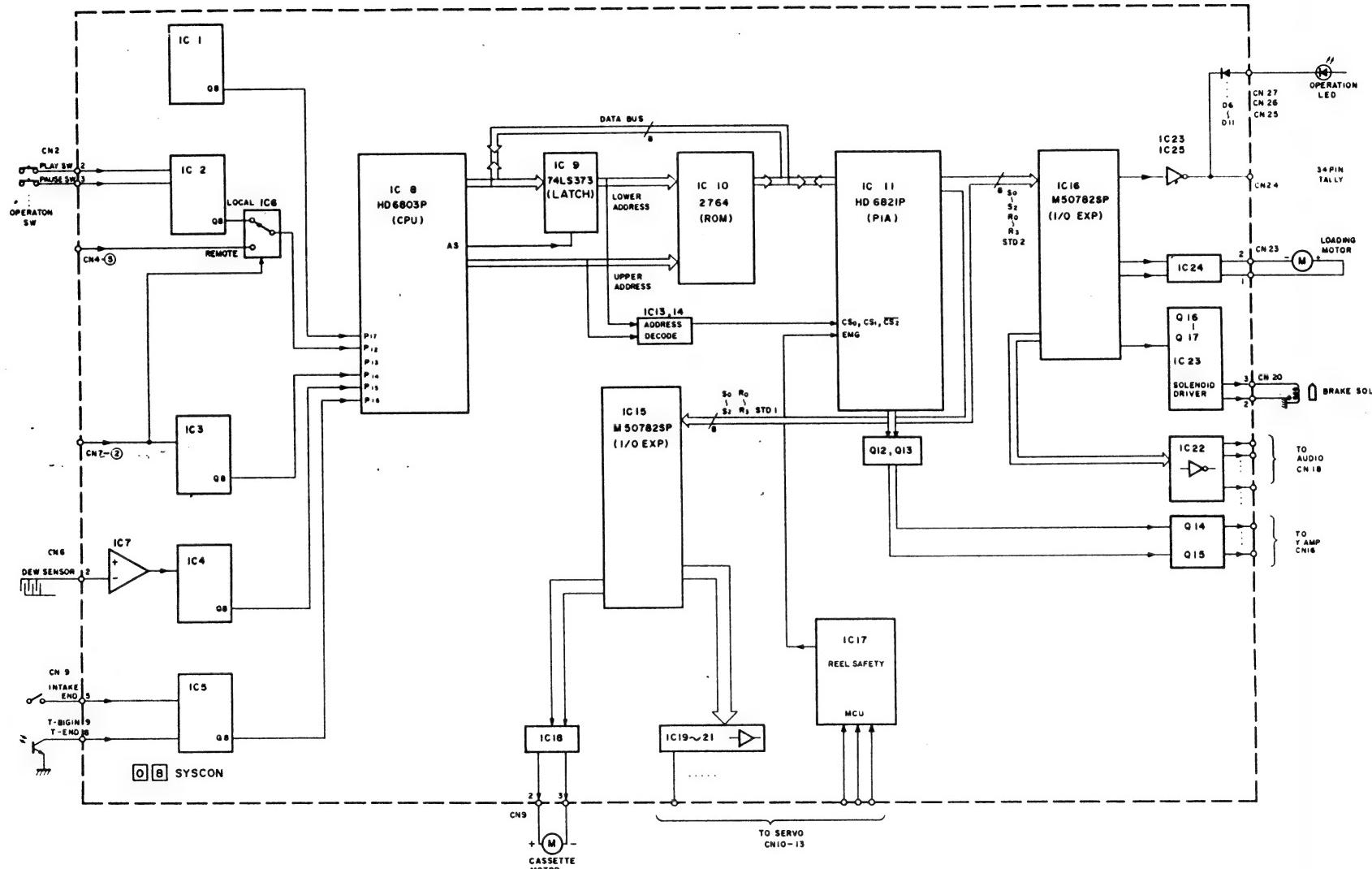
4.8 REEL SERVO BLOCK DIAGRAM



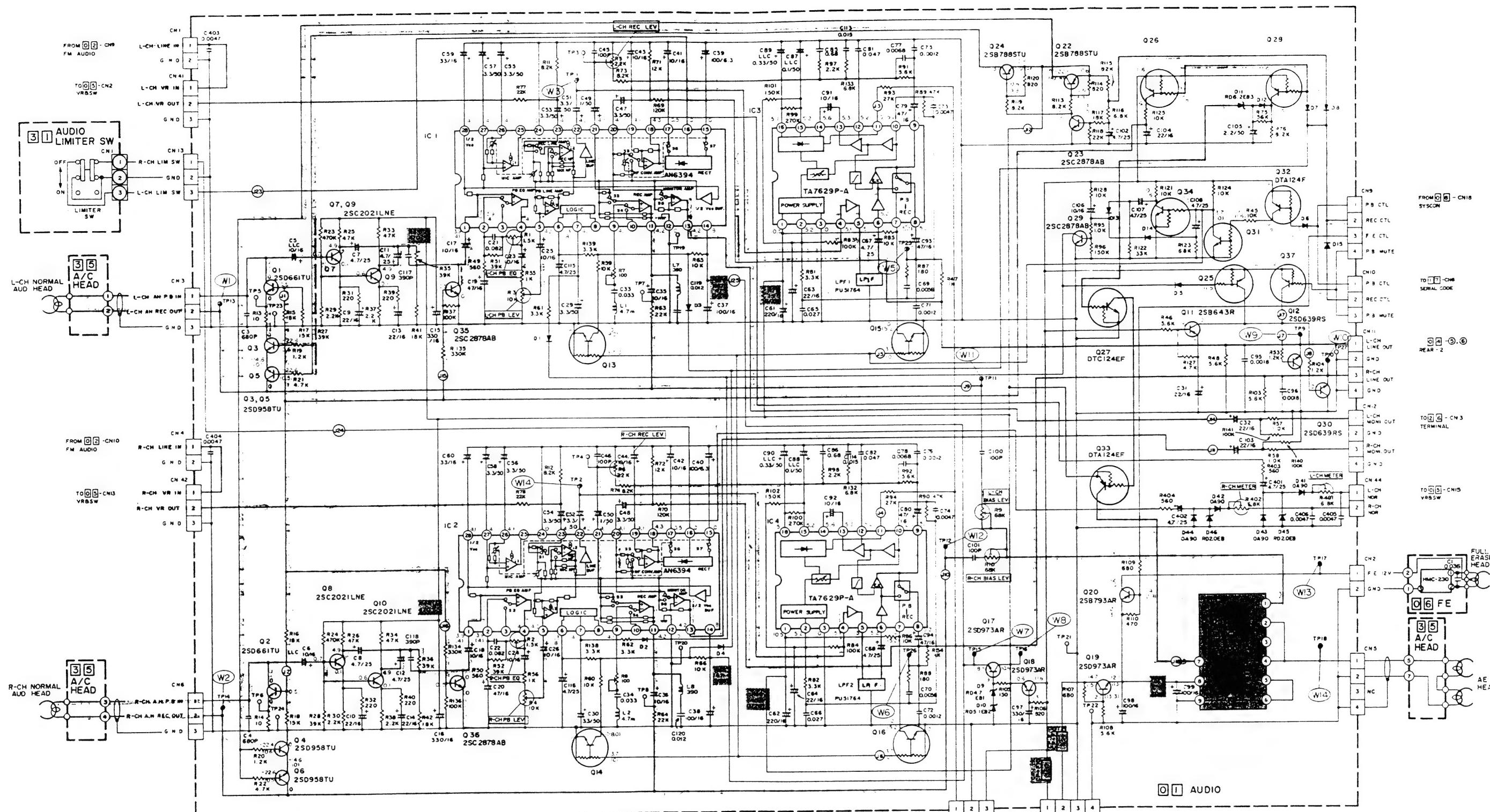
4.9 D/C SERVO BLOCK DIAGRAM



4.10 SYSTEM CONTROL BLOCK DIAGRAM



4.11 AUDIO SCHEMATIC DIAGRAM



NOTES: Unless otherwise specified;

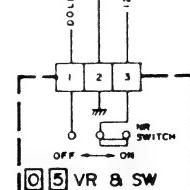
1. All resistance values are in ohms. (1/6W).
 2. All inductance values are in μ H.
 3. All capacitance values are in μ F.
 4. Voltages are DC-measured with a digital voltmeter during recording mode.
 5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.

6. Shaded (■) parts are critical for safety. Replace only with specified part numbers.

7. NPN type digital transistors are DTC124F.
 8. PNP type digital transistors are DTA124F.
 9. All diodes are 1SS133.

3. All diseases are preventable

- RECORDING SIGNAL PATH
- PLAYBACK SIGNAL PATH
- DISPLAY SIGNAL PATH



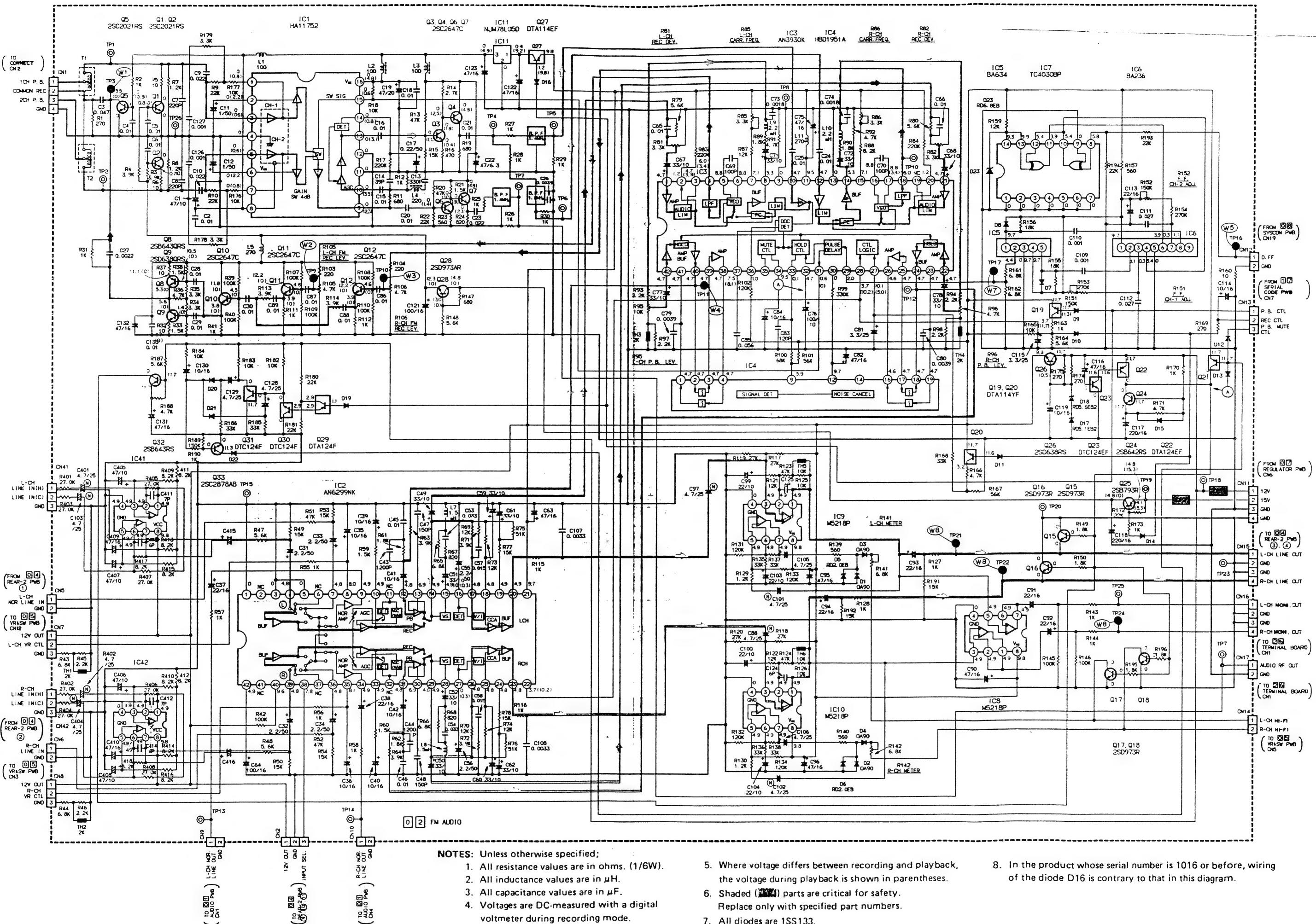
01 AUDIO 4-12

4-12 AUDIO

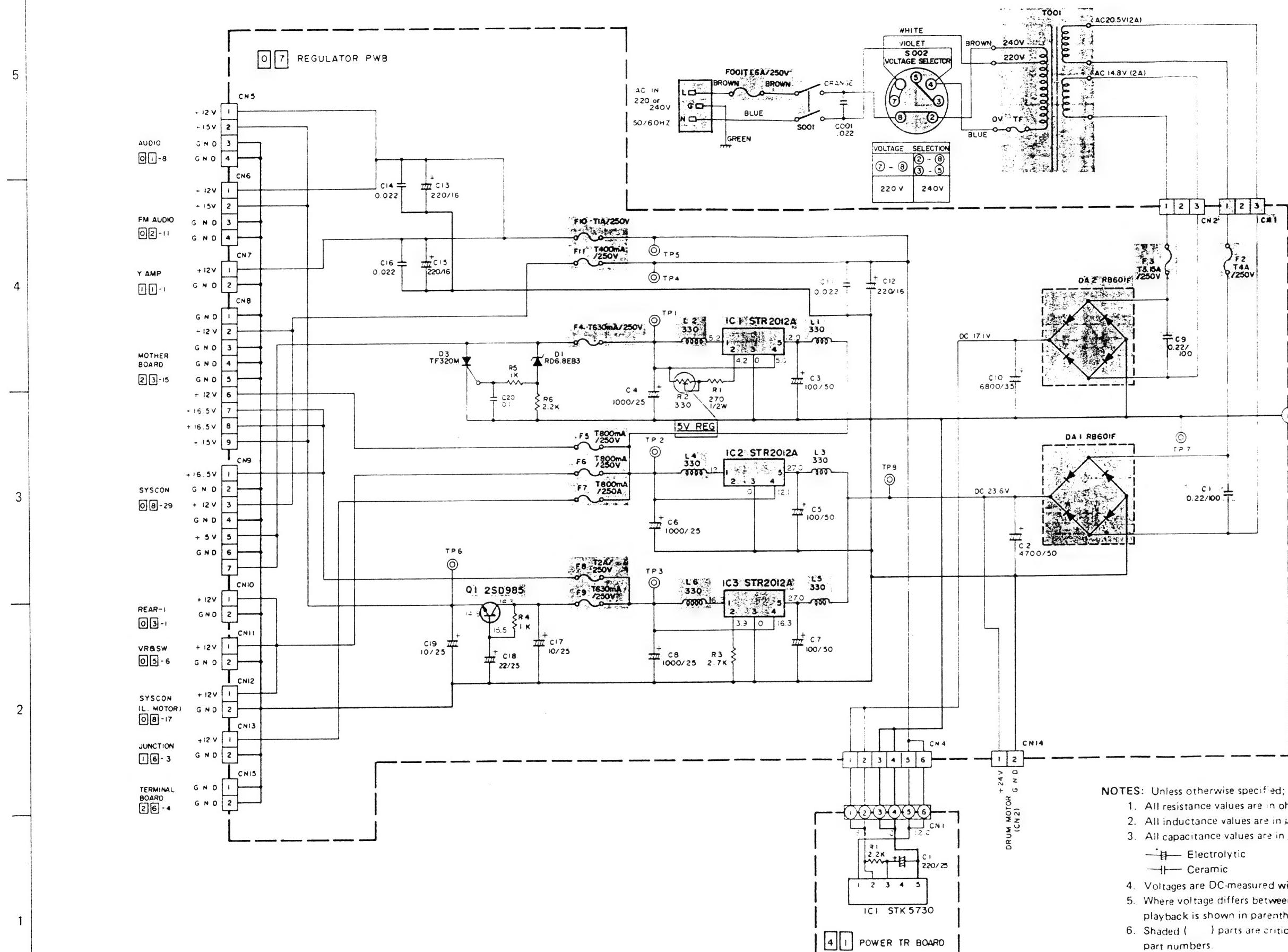
6

T

4.13 FM AUDIO SCHEMATIC DIAGRAM



4.15 REGULATOR & POWER TRANSISTOR SCHEMATIC DIAGRAMS



A

B

C

0 7 REG. & etc.

416

4-16

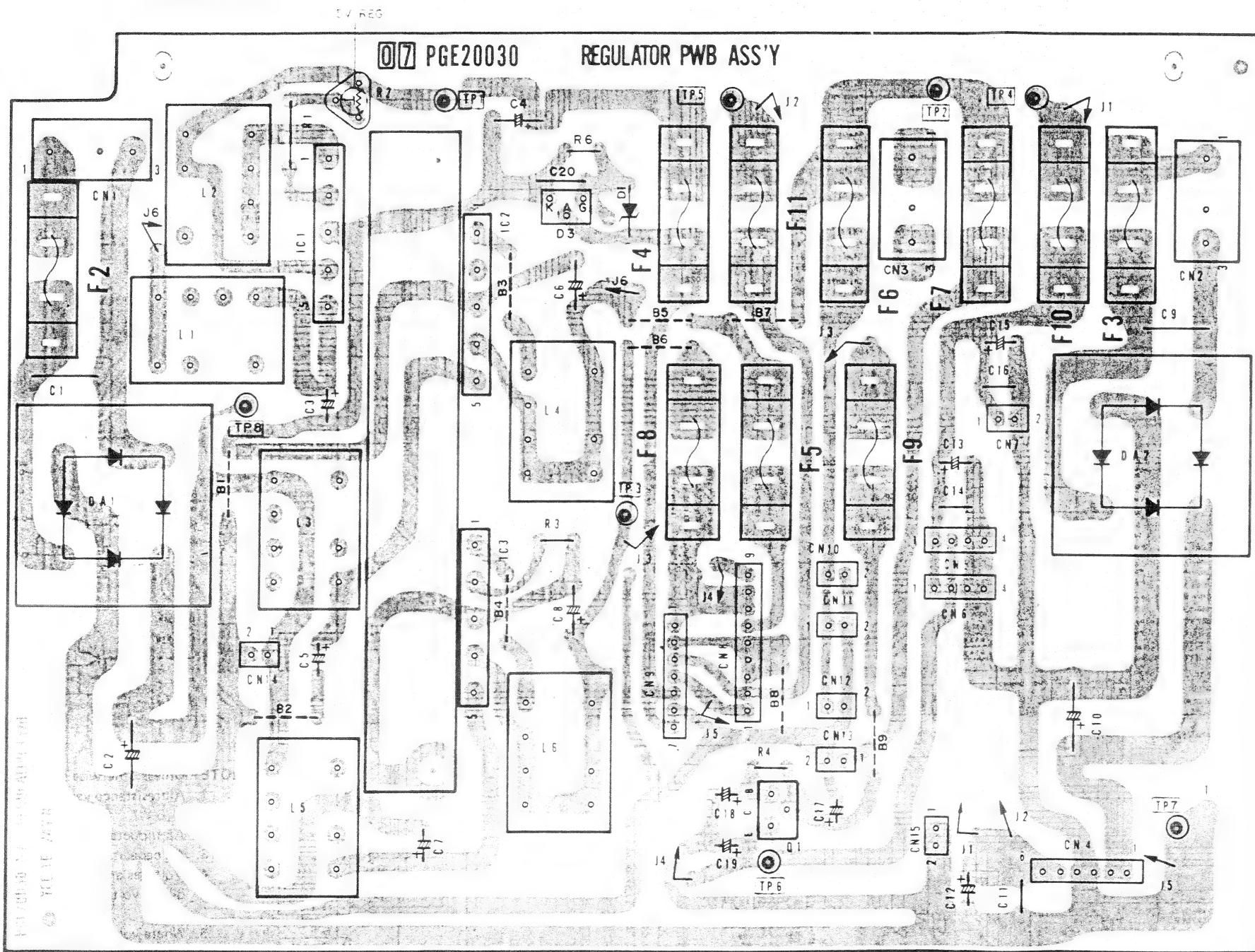
0 7 REG. & etc.

F

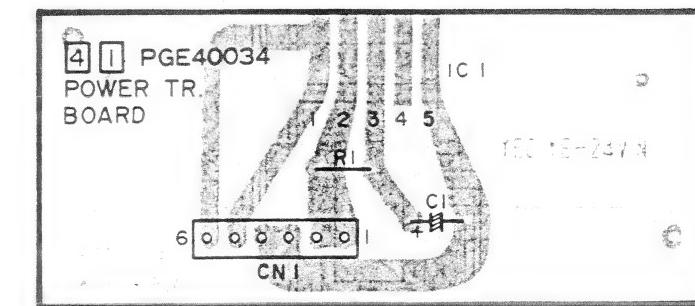
G

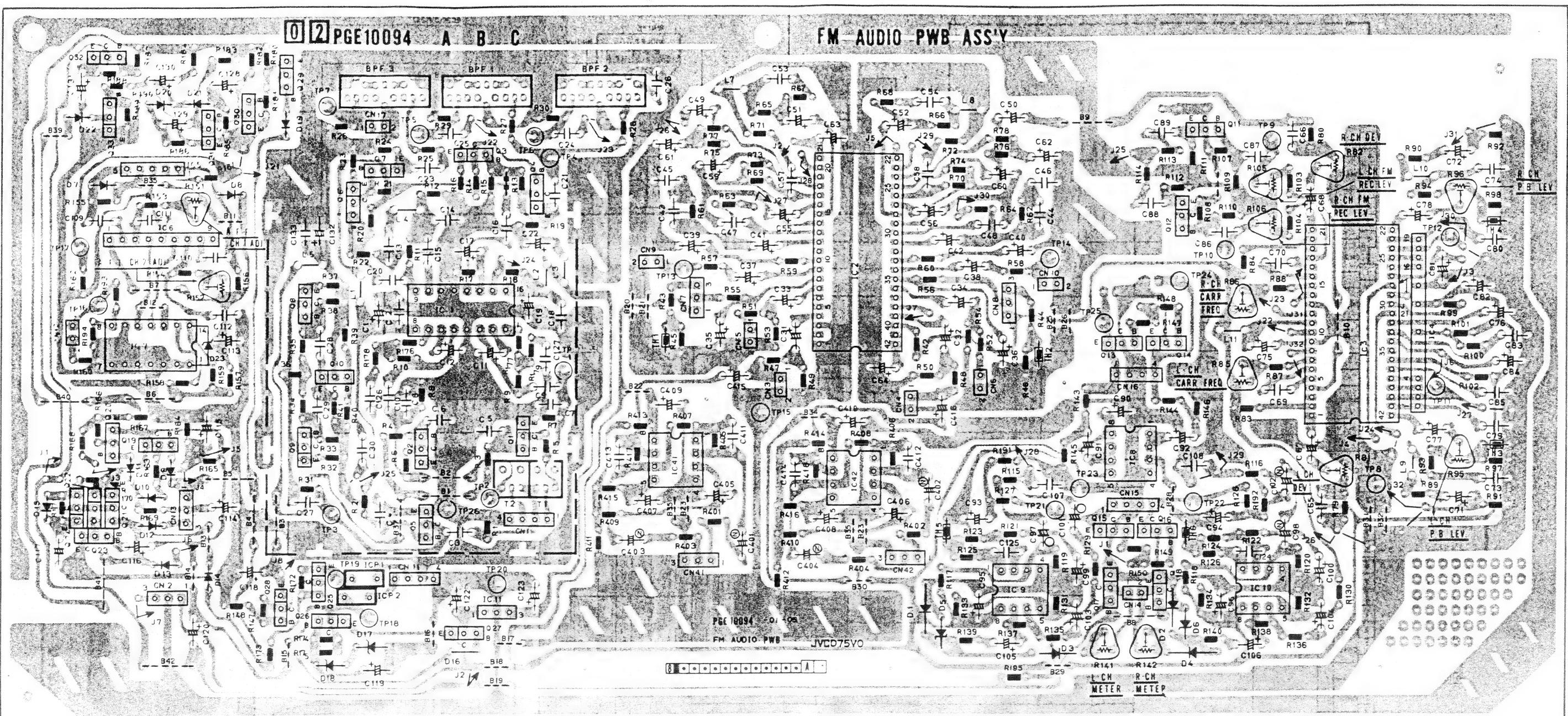
H

- REGULATOR -

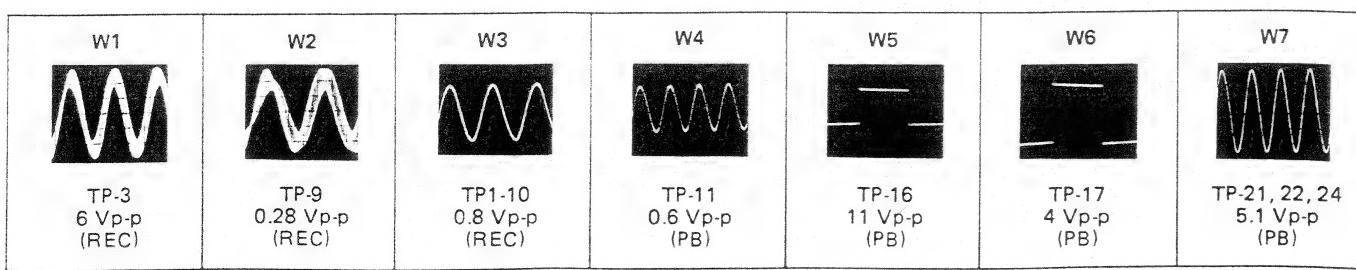


- POWER TRANSISTOR -





— MAIN WAVEFORMS OF FM AUDIO CIRCUIT —



A

B

C

02 FM AUDIO

4-15

02 FM AUDIO

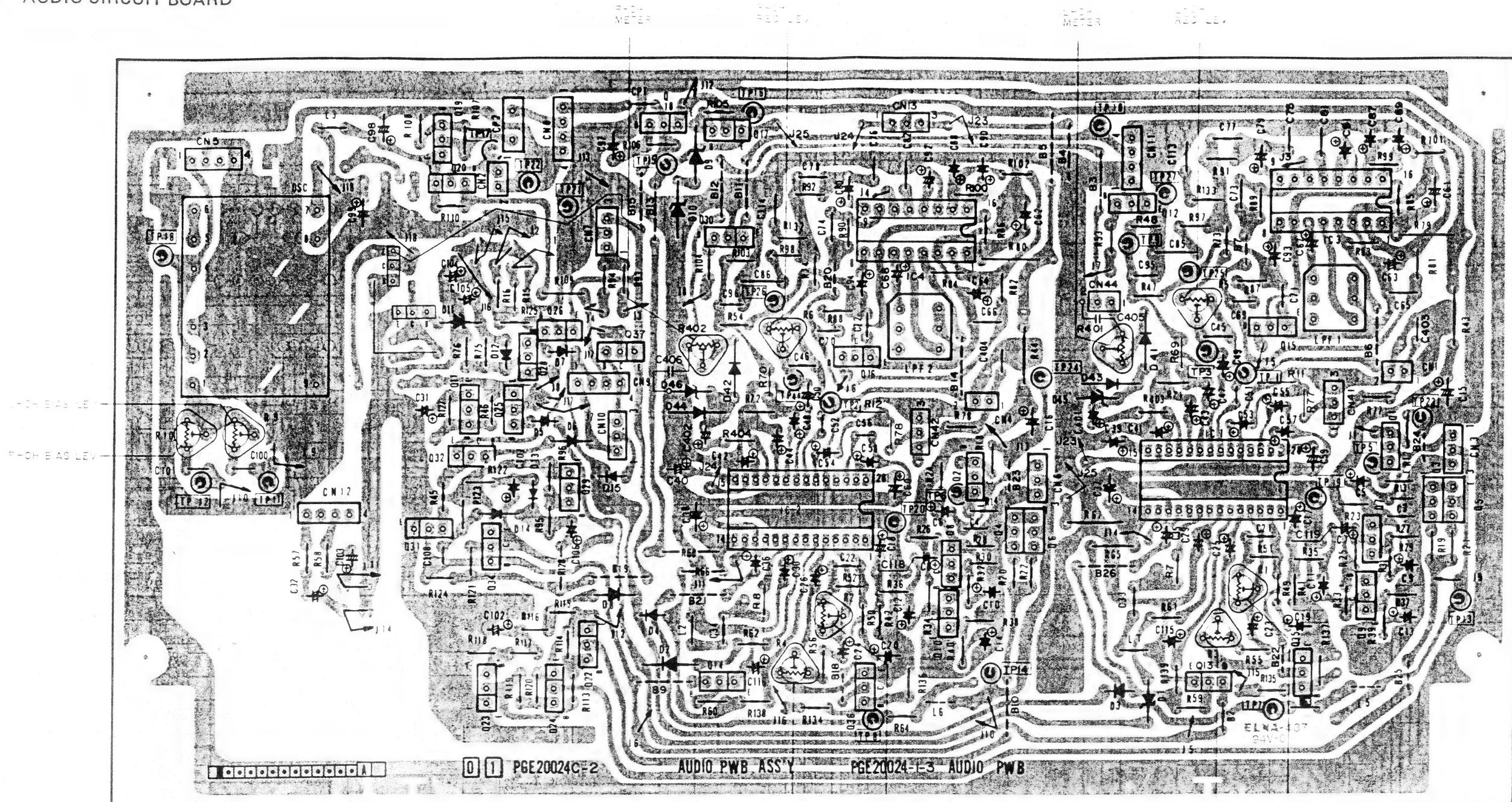
4-15

F

G

H

4.12 AUDIO CIRCUIT BOARD



— MAIN WAVEFORMS OF
AUDIO CIRCUIT —

W1	W2	W3	W4	W5	W6	W7
TP-13 29 Vp-p 70 kHz (REC)	TP-14 28 Vp-p 70 kHz (REC)	TP-1 0.06 Vp-p 1 kHz (PB)	TP-2 0.06 Vp-p 1 kHz (PB)	TP-25 2 Vp-p 1 kHz (PB)	TP-26 2 Vp-p 1 kHz (PB)	TP-15 8.5 V DC
W8	W9	W10	W11	W12	W13	W14
TP-16 10.6 V DC	TP-9 1 Vp-p 1 kHz (PB)	TP-10 1 Vp-p 1 kHz (PB)	TP-11 42 Vp-p 70 kHz (REC)	TP-12 42 Vp-p 70 kHz (REC)	TP-17 12.1 V DC (REC)	TP-18 85 Vp-p 70 kHz (REC)

A

B

C

0 1 AUDIO 4-13

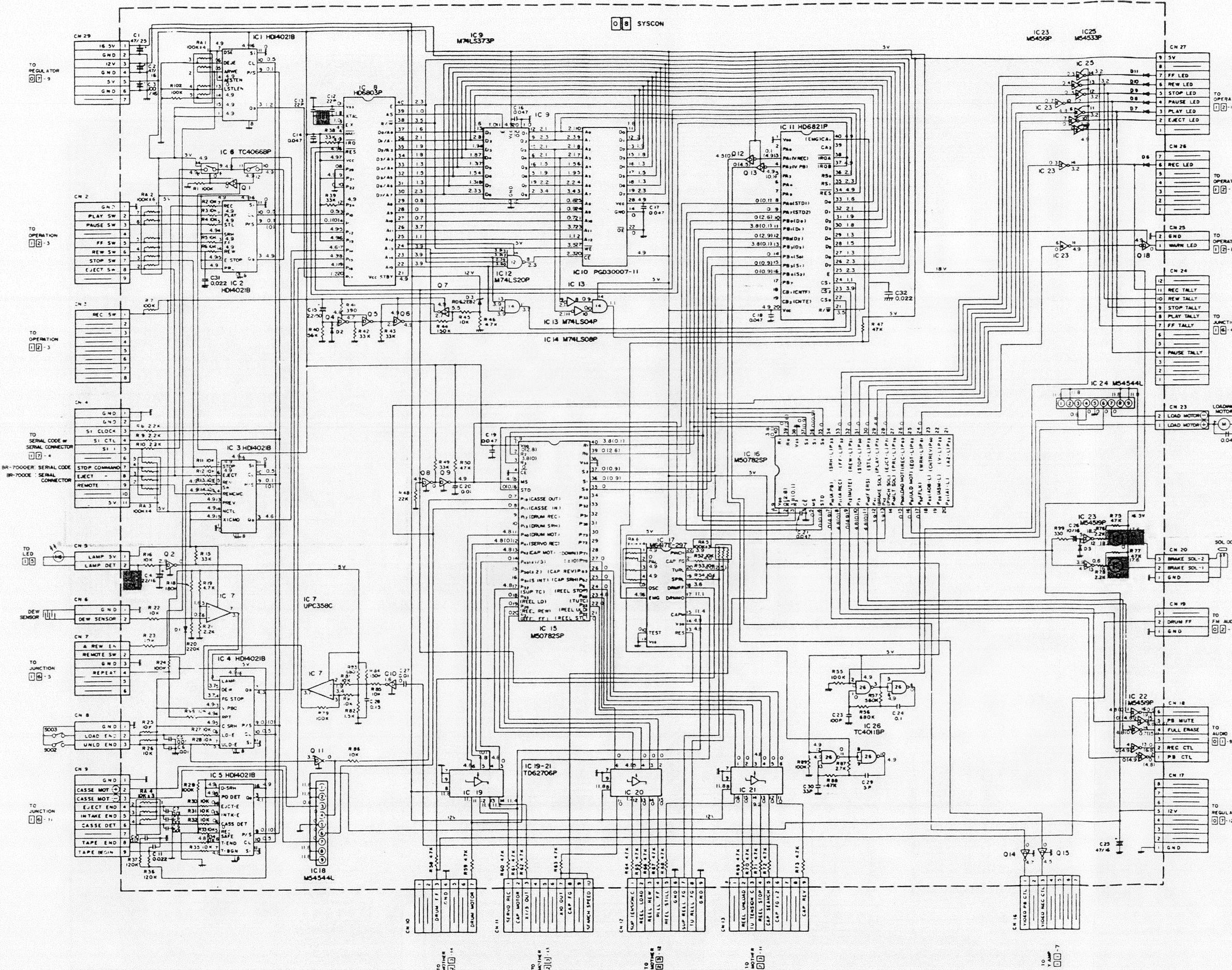
4-13 0 1 AUDIO

F

G

H

4.17 SYSTEM CONTROL SCHEMATIC DIAGRAM



0 8 SYSCON

4-18

0 8 SYSCON

4-18

F

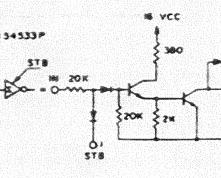
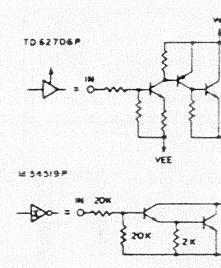
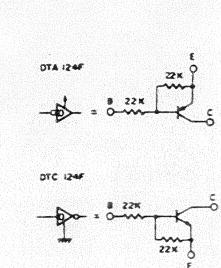
G

H

- NOTE:** Unless otherwise specified;
- All resistance values are in ohms. (1/6 W)
 - All inductance values are in μ H.
 - All capacitance values are in μ F.
 - Voltages are DC-measured with a digital voltmeter during recording mode.
 - Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
 - Shaded (■) parts are critical for safety. Replace only with specified part numbers.
 - PNP type transistors are 2SB907.
 - NPN type digital transistors are DTC124F.
 - PNP type digital transistors are DTA124F.
 - All diodes are 1SS133.

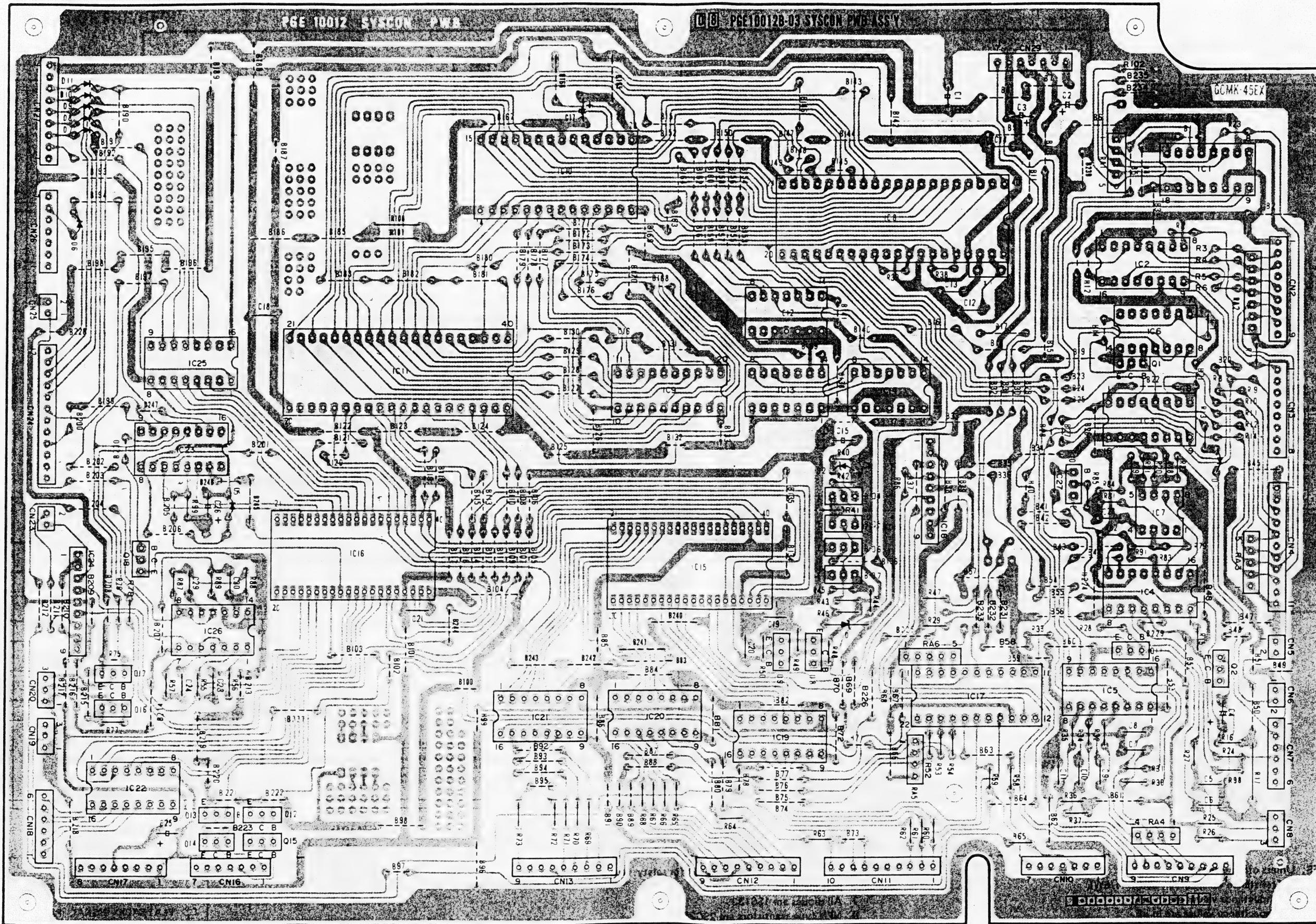
IC 1-3	HD4021B	17	LM6417E-297
4	TC4066BP	18	MS4344L
5	μ PC358C	19-21	TD62706P
6	MS6803P	22,23	MS4519P
7	M74LS373P	24	MS4344L
8	PGD30007-11	25	MS4333P
9	HD6821P	26	TC401BP
10	M74LS20P		
11	M74LS04P		
12	M74LS08P		
13	M50782SP		
14	M50782SP		
15-16	M50782SP		

0 1, 4, 5, 6, 7, 12, 13, 18 ----- DTA124F
0 2, 8, 9, 10, 11, 14, 15 ----- DTC124F
0 16, 17 ----- 2SB907



1. All resistance values are in ohms. (1/6 W)
2. All inductance values are in μ H.
3. All capacitance values are in μ F.
4. Voltages are DC-measured with a digital voltmeter during recording mode.
5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
6. Shaded (■) parts are critical for safety. Replace only with specified part numbers.
7. PNP type transistors are 2SB907.
8. NPN type digital transistors are DTC124F.
9. PNP type digital transistors are DTA124F.
10. All diodes are 1SS133.

6
4.18 SYSTEM CONTROL CIRCUIT BOARD



A

B

C

0 8 SYSCON

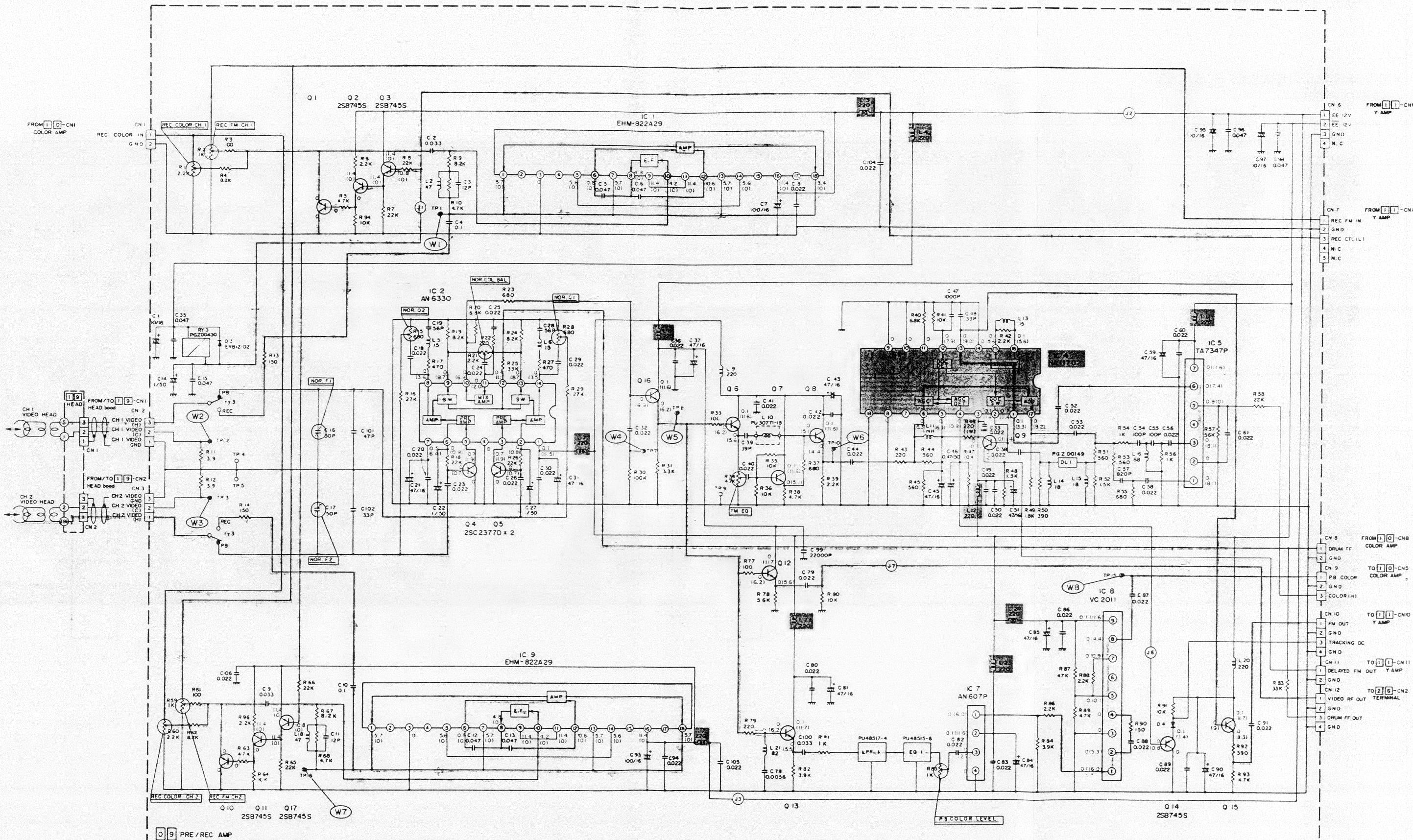
4-19

0 8 SYSCON

F

G

H



NOTES: Unless otherwise specified;

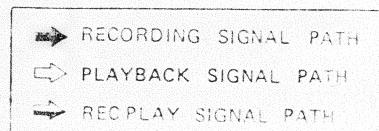
1. All resistance values are in ohms. (1/6W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.
4. Voltages are DC-measured with a digital voltmeter during recording mode.
5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.

6. Shaded (■) parts are critical for safety. Replace only with specified part numbers.

7. All diodes are 1SS133.
8. NPN type transistors are 2SC2647C.

—E— Electrolytic

—H— Mylar or Cermic



A

B

C

0 9 PRE/REC

4-20

0 9 PRE/REC

F

F

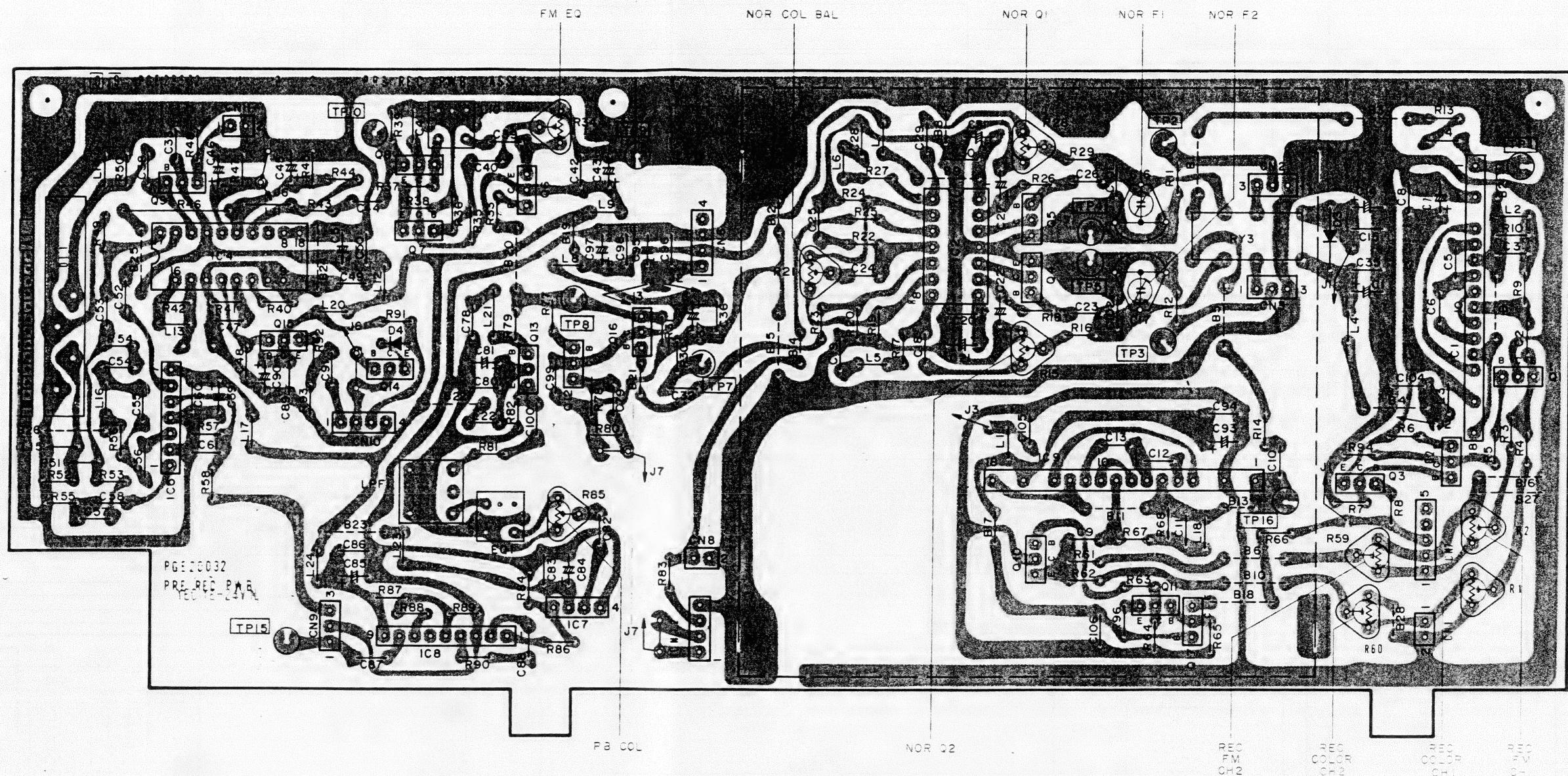
G

H

6
4.20 PRE/REC CIRCUIT BOARD

5
— MAIN WAVEFORMS OF PRE/REC
AMP CIRCUIT —

W1	W2
W3	W4
W5	W6
W7	W8



A

B

C

09 PRE/REC

4-21

09 PRE/REC

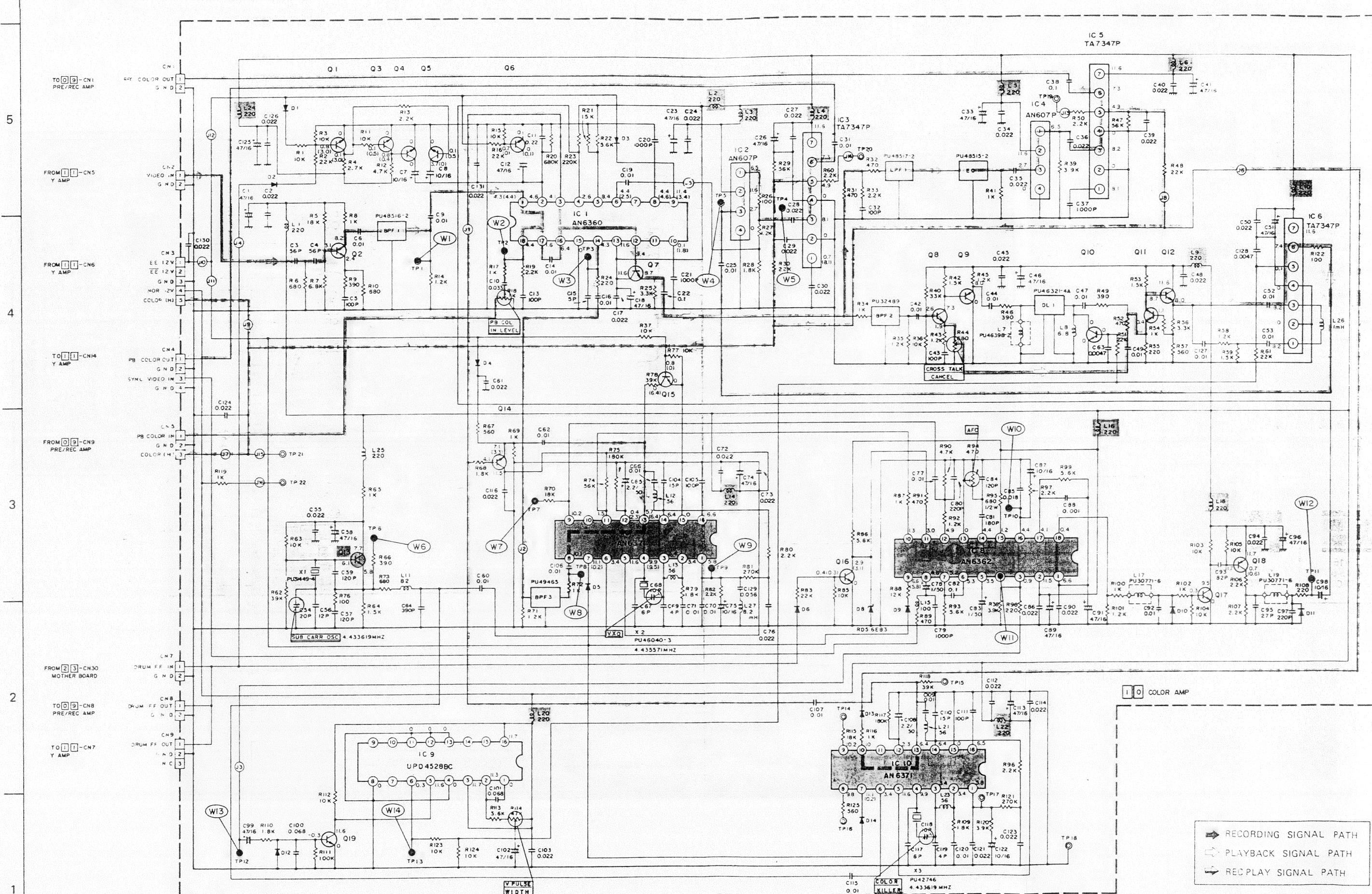
4-21

F

G

H

4.21 COLOR SCHEMATIC DIAGRAM



VOLTAGE WIDTH

RECORDING SIGNAL PATH
PLAYBACK SIGNAL PATH
REPLAY SIGNAL PATH

A

B

C

4-22 10 COLOR

4-22 10 COLOR

E

F

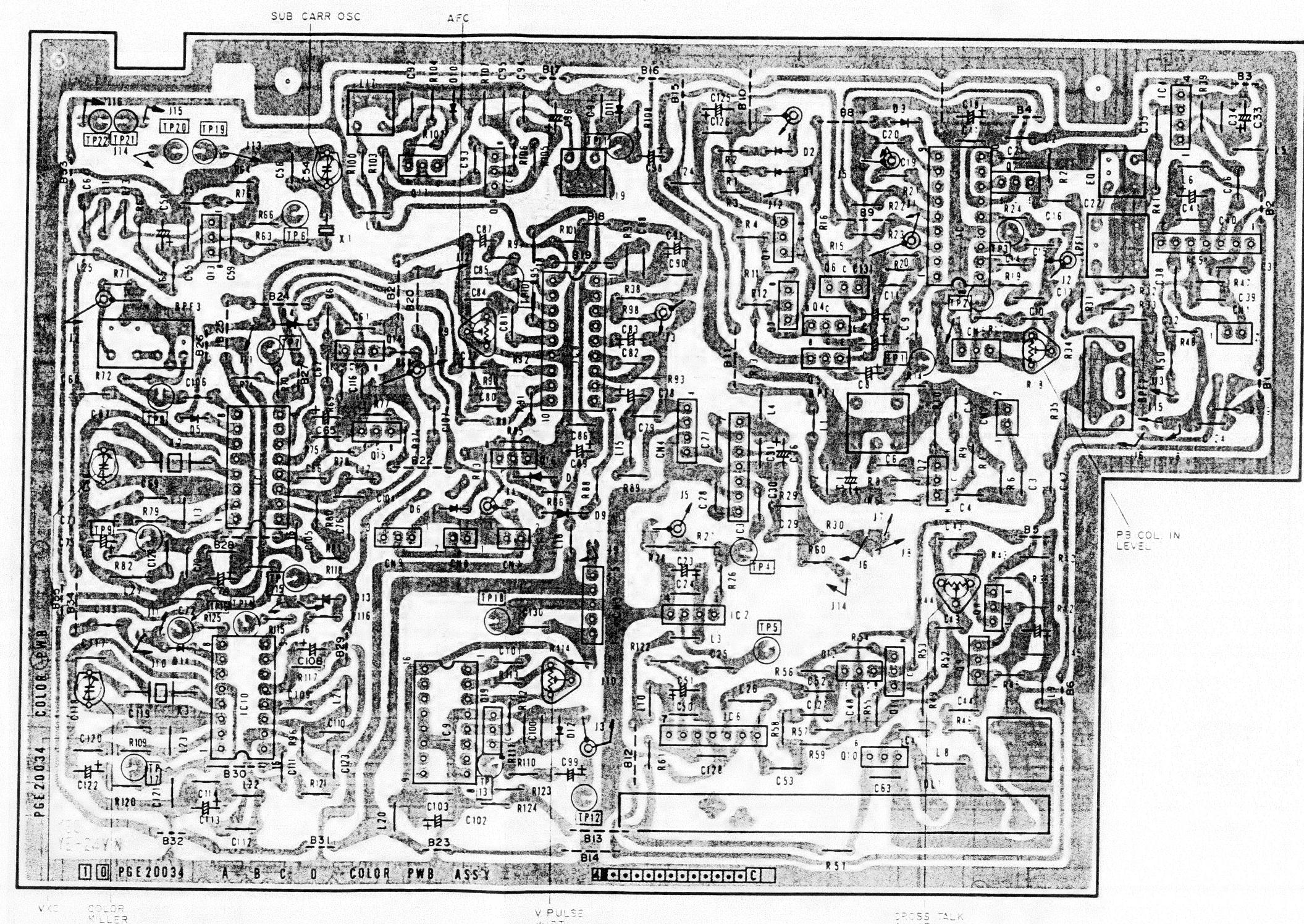
G

H

4.22 COLOR CIRCUIT BOARD

- MAIN WAVEFORMS OF VIDEO (COLOR) CIRCUIT -

W1	W2
TP-1 3.2 Vp-p (REC)	TP-2 0.25 Vp-p (PB)
W3	W4
TP-3 0.36 Vp-p 5.06 MHz	TP-5 70 mVp-p (PB)
W5	W6
TP-4 0.6 Vp-p (PB)	TP-6 4.43619 MHz
W7	W8
TP-7 1 Vp-p 625 kHz	TP-8 1.6 Vp-p, (REC) 1.8 Vp-p, (PB) 5.06 MHz
W9	W10
TP-9 5.8 VDC (REC)	TP-10 4.4 VDC
W11	W12
IC8, Pin 4 6 Vp-p 16.625 kHz	TP-11 4.6 Vp-p, (REC) 5.2 Vp-p, (PB)
W13	W14
TP-12 8 Vp-p, 50 Hz (PB)	TP-13 150 mVp-p (PB)



4.23 Y AMP SCHEMATIC DIAGRAM

NOTES: Unless otherwise specified;

1. All resistance values are in ohms. (1/8 W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.

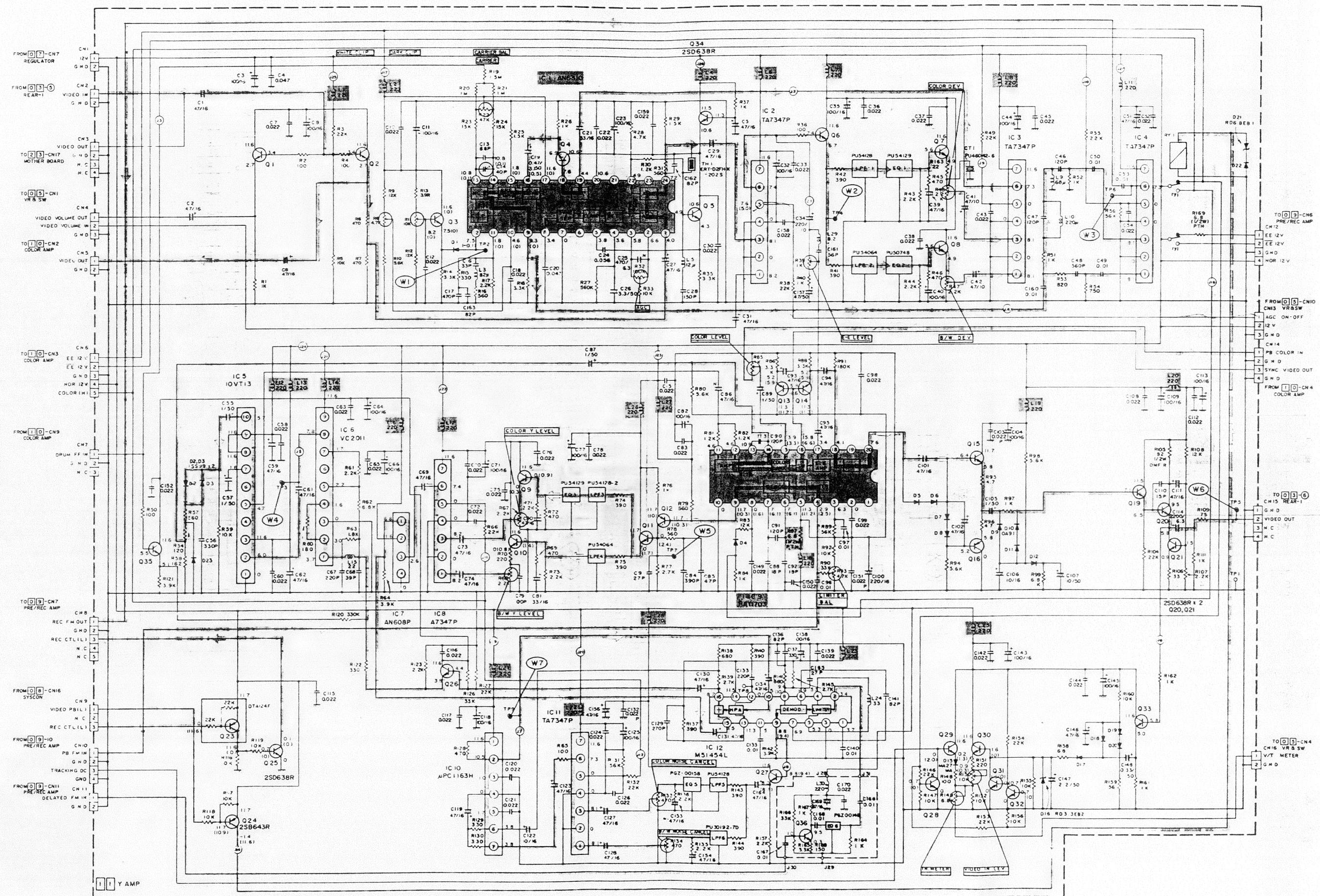
4. Voltages are DC-measured with a digital voltmeter during recording mode.

5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.

6. Shaded (■) parts are critical for safety. Replace only with specified part numbers.

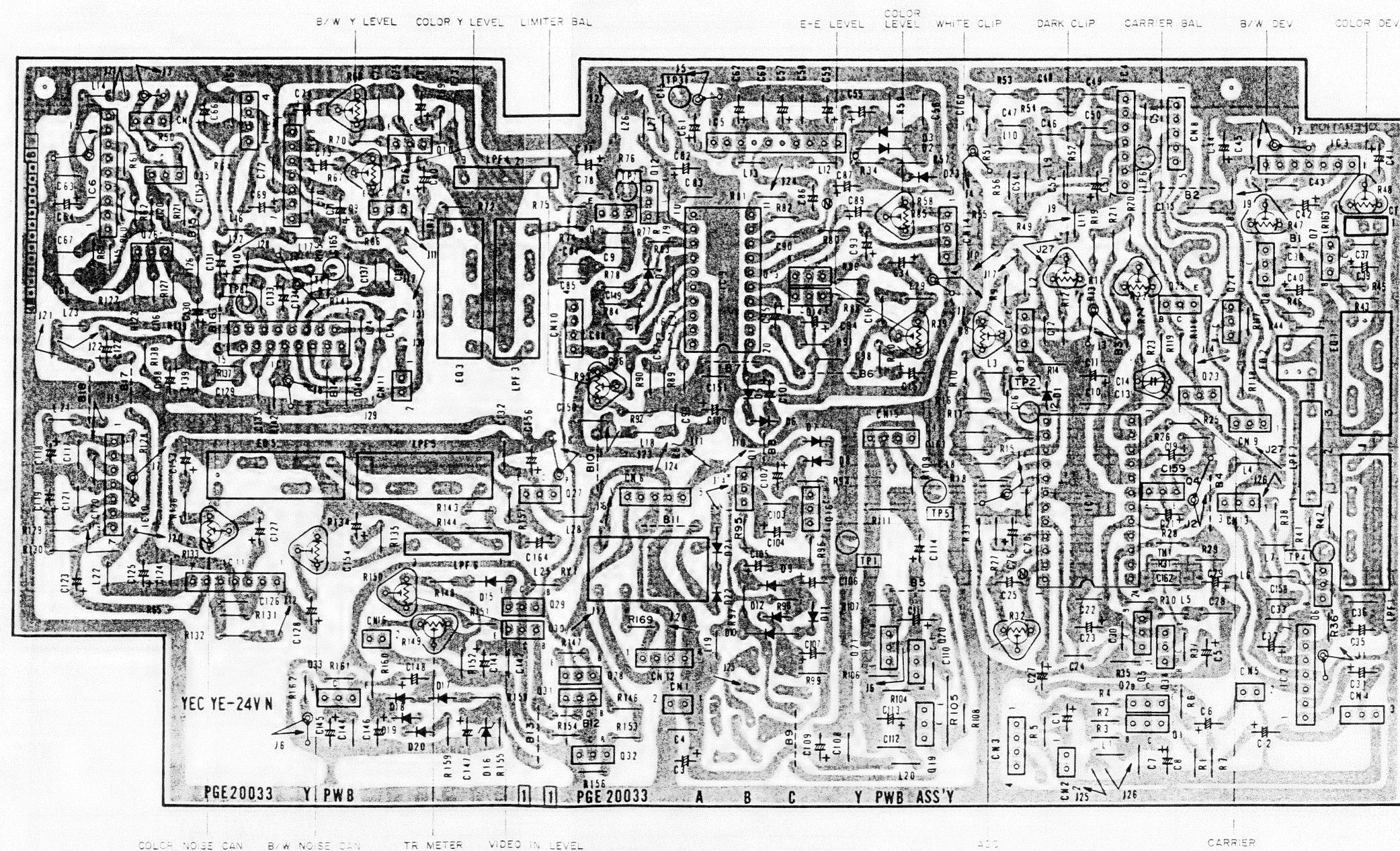
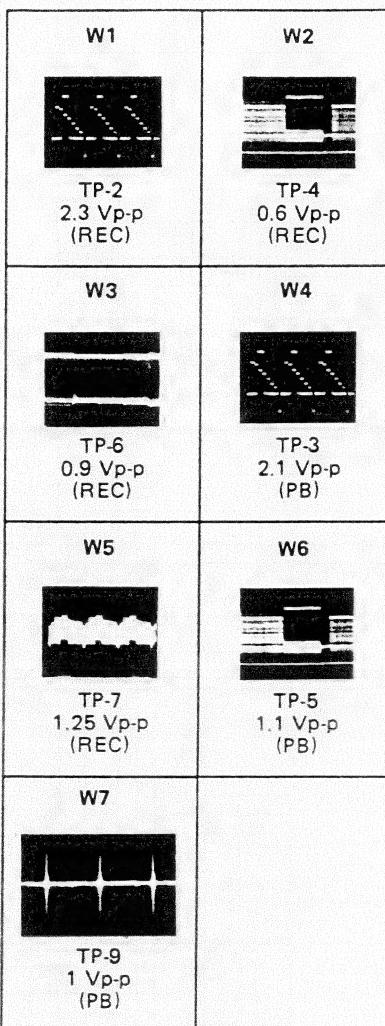
7. NPN type transistors are 2SC2647C.

8. PNP type transistors are 2SB641Q.

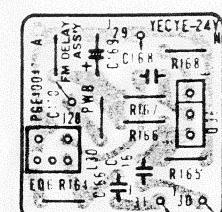


4.24 Y AMP CIRCUIT BOARD

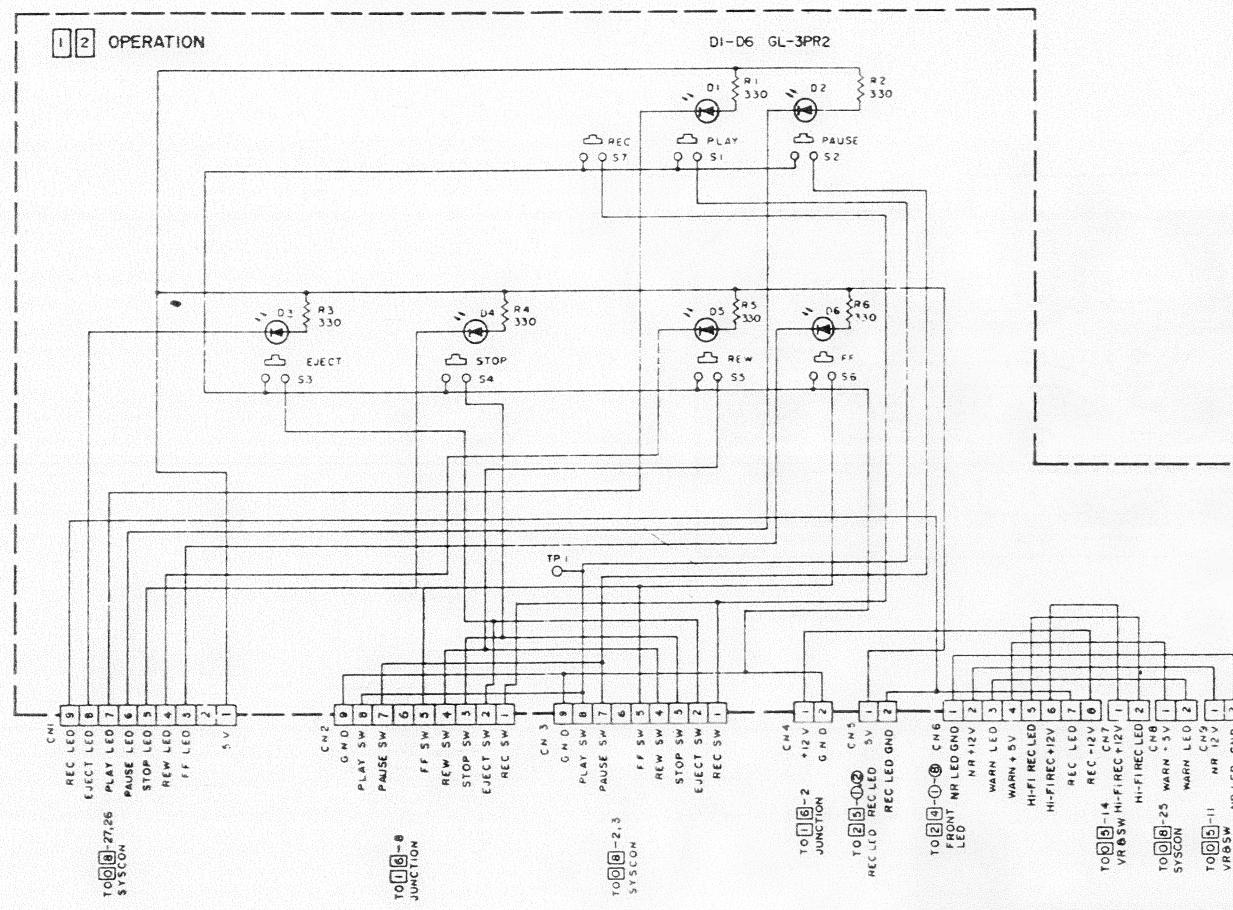
— MAIN WAVEFORMS OF
VIDEO (Y) CIRCUIT —



— FM DELAY —



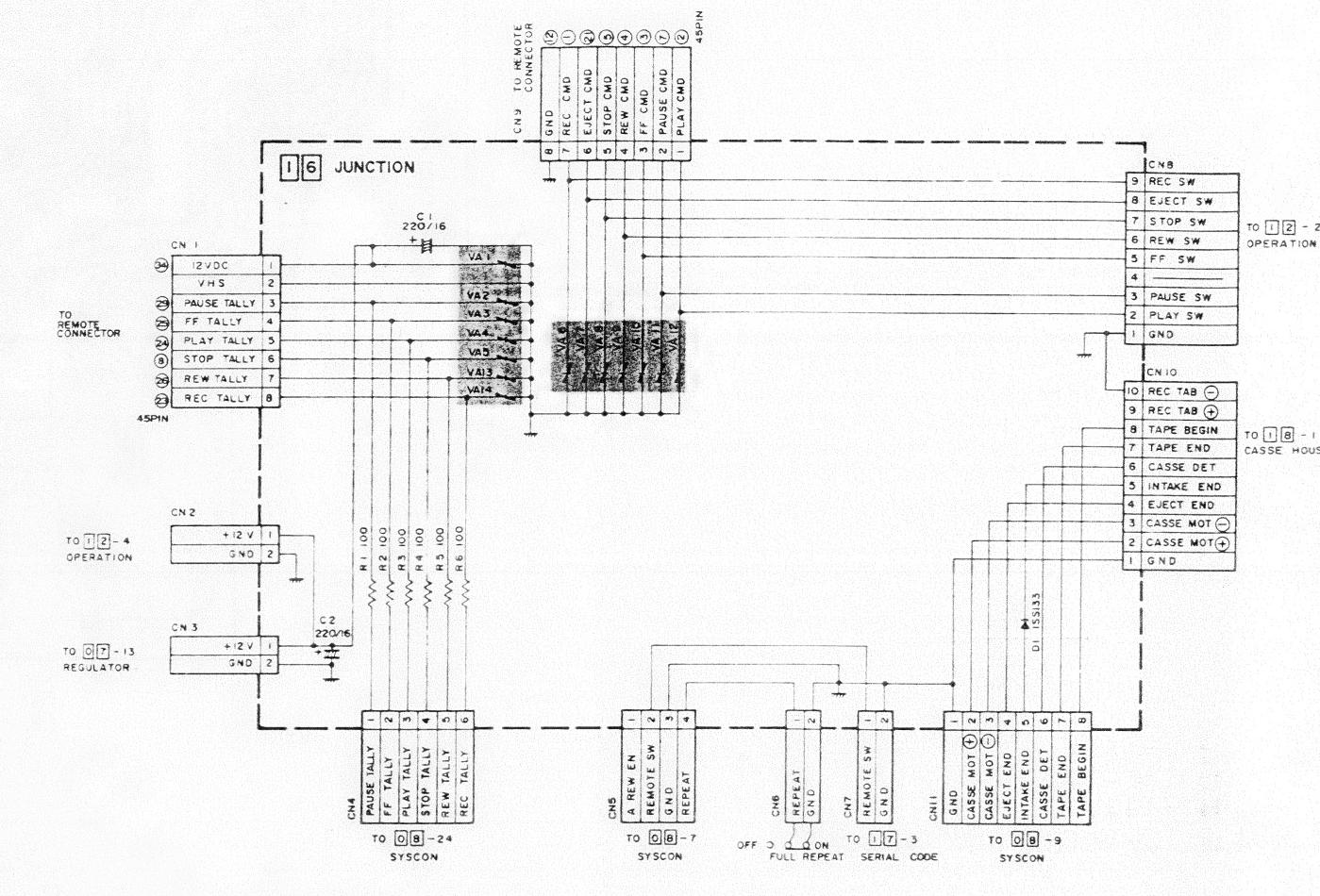
4.25 OPERATION SCHEMATIC DIAGRAM



NOTES: Unless otherwise specified.

1. All resistance values are in ohms. (1/8 W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.

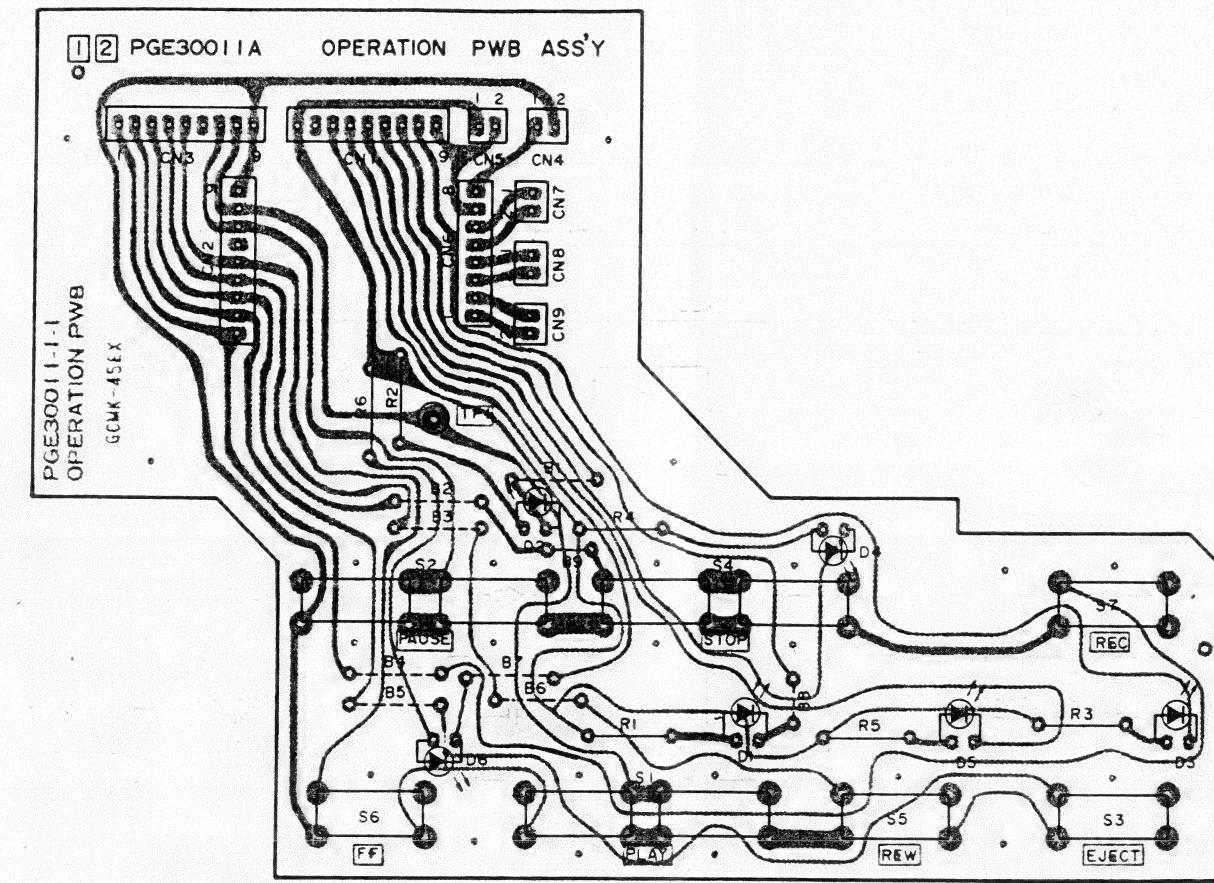
4.26 JUNCTION SCHEMATIC DIAGRAM



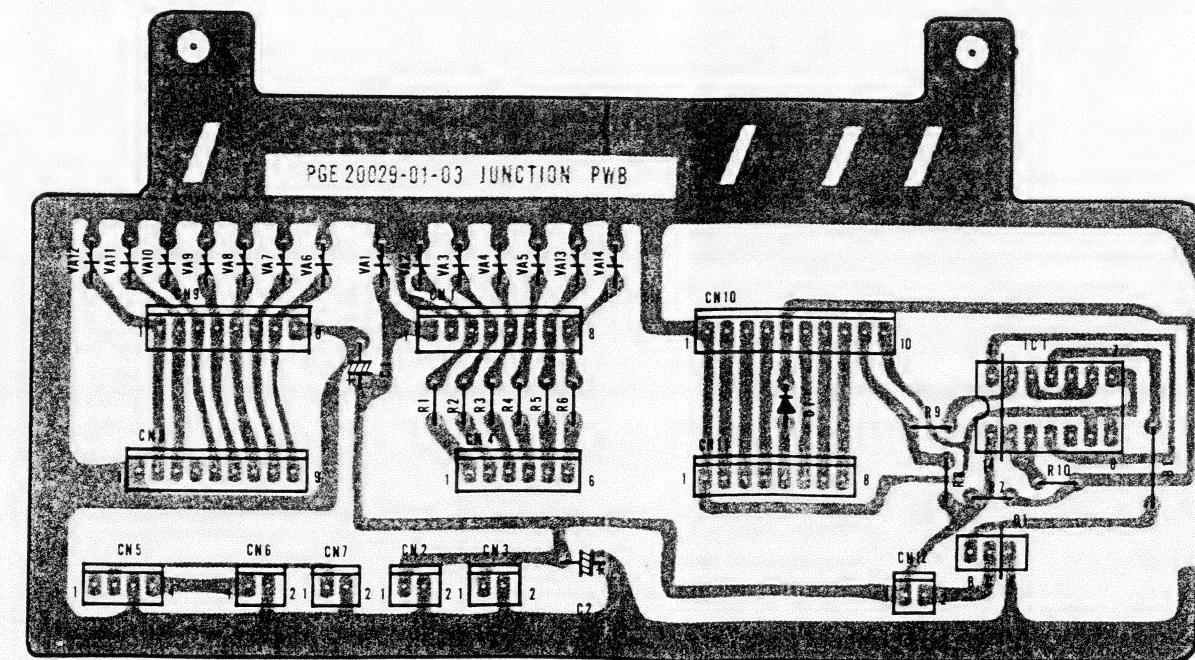
NOTES: Unless otherwise specified.

1. All resistance values are in ohms. (1/6 W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.
4. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
5. All varistors are PU49624-2.

6
4.27 OPERATION CIRCUIT BOARD



4.28 JUNCTION CIRCUIT BOARD



A

B

C

1 2 OPE, 1 6 JUNCTION

4-27

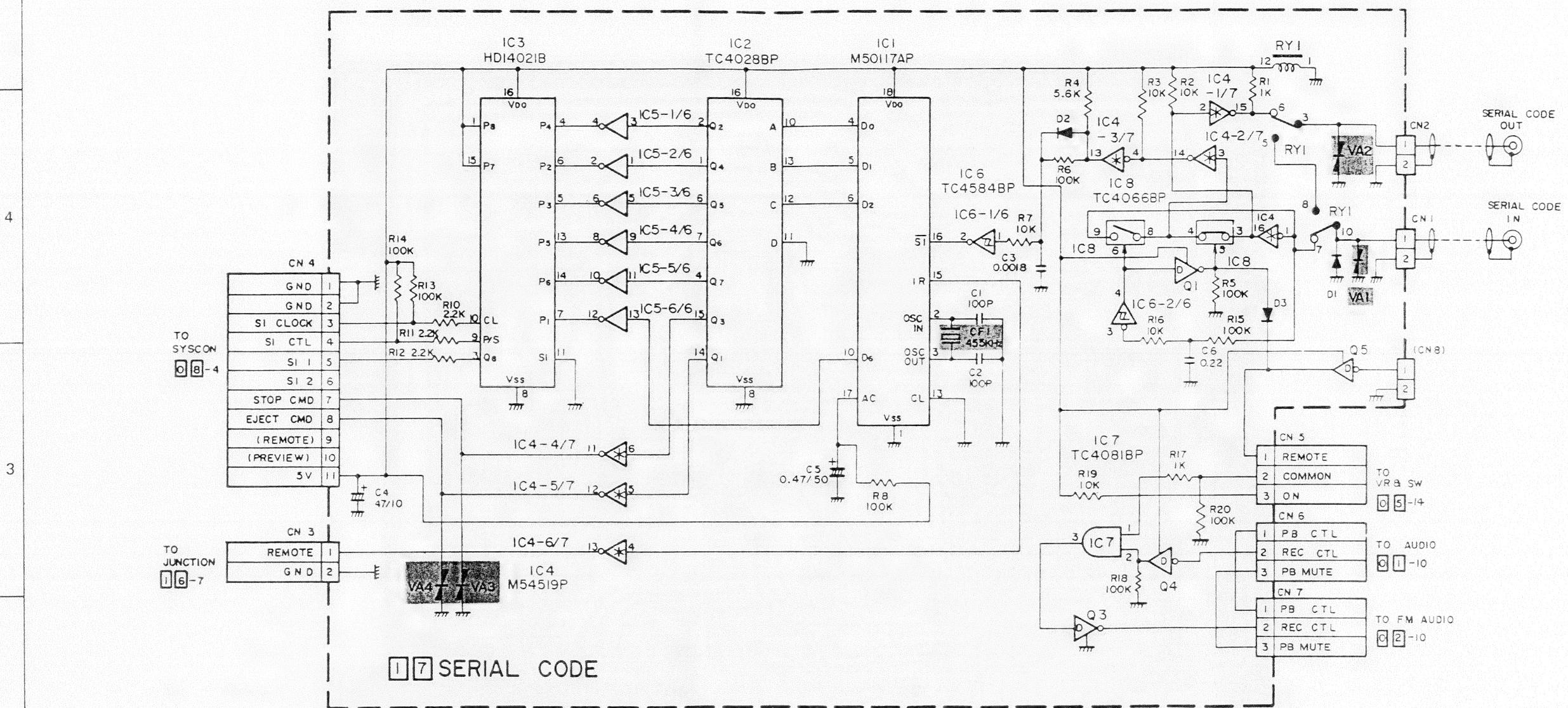
1 2 OPE, 1 6 JUNCTION

F

G

H

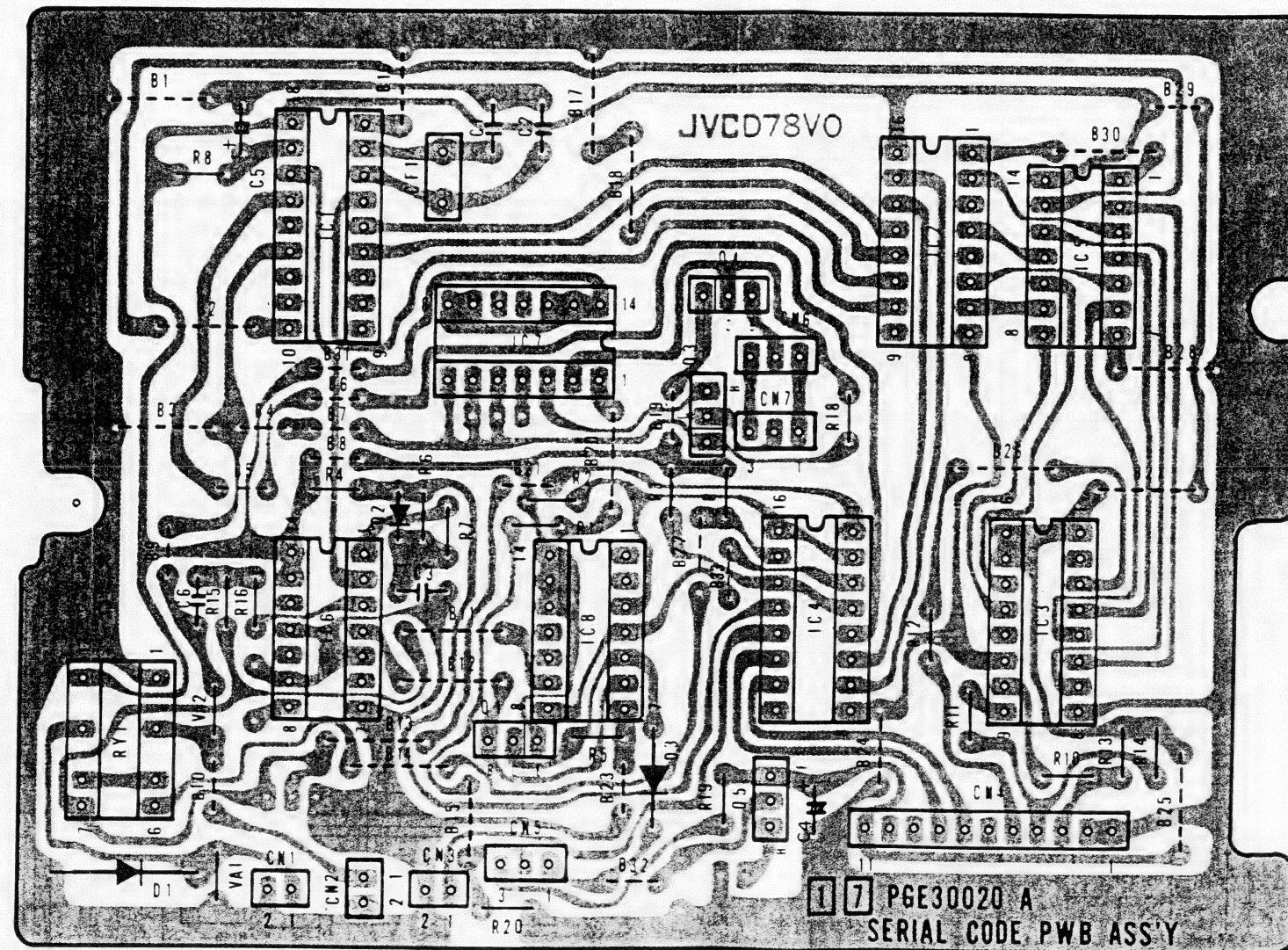
4.29 SERIAL CODE SCHEMATIC DIAGRAM



NOTES: Unless otherwise specified.

1. All resistance values are in ohms. (1/6 W).
2. All inductance values are in μ H.
3. All capacitance values are in μ F.
4. All varistors are PU49624-2.

6
4.30 SERIAL CODE CIRCUIT BOARD



A

B

C

17 SERIAL CODE

4-29

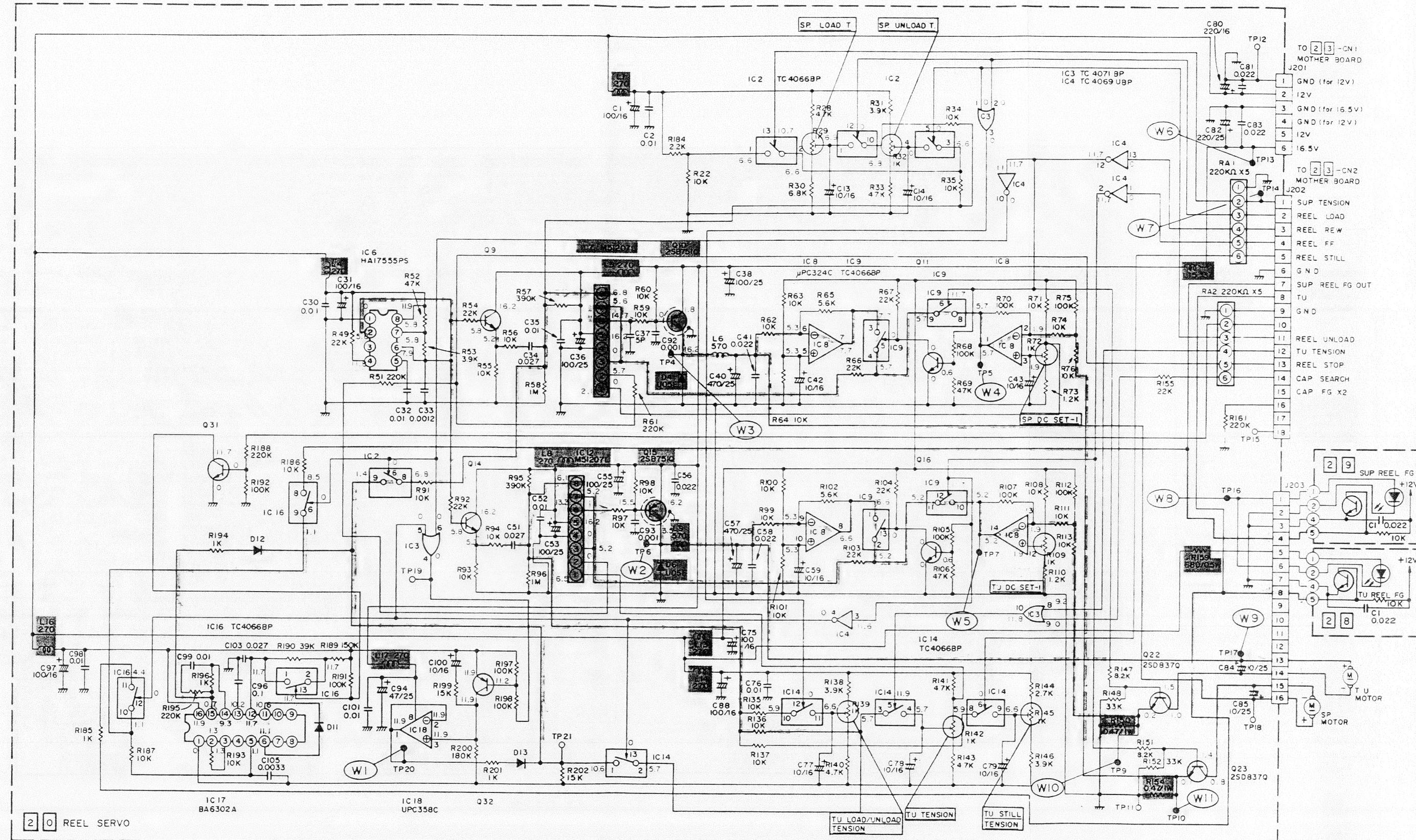
4-29

17 SERIAL CODE

F

G

H



NOTES: Unless otherwise specified

1. All resistance values are in ohms. (1/6W).
 2. All inductance values are in μ H.
 3. Voltages are DC-measured with a digital voltmeter during recording mode.
 4. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
 5. Shaded (■) parts are critical for safety. Replace only with specified part numbers.

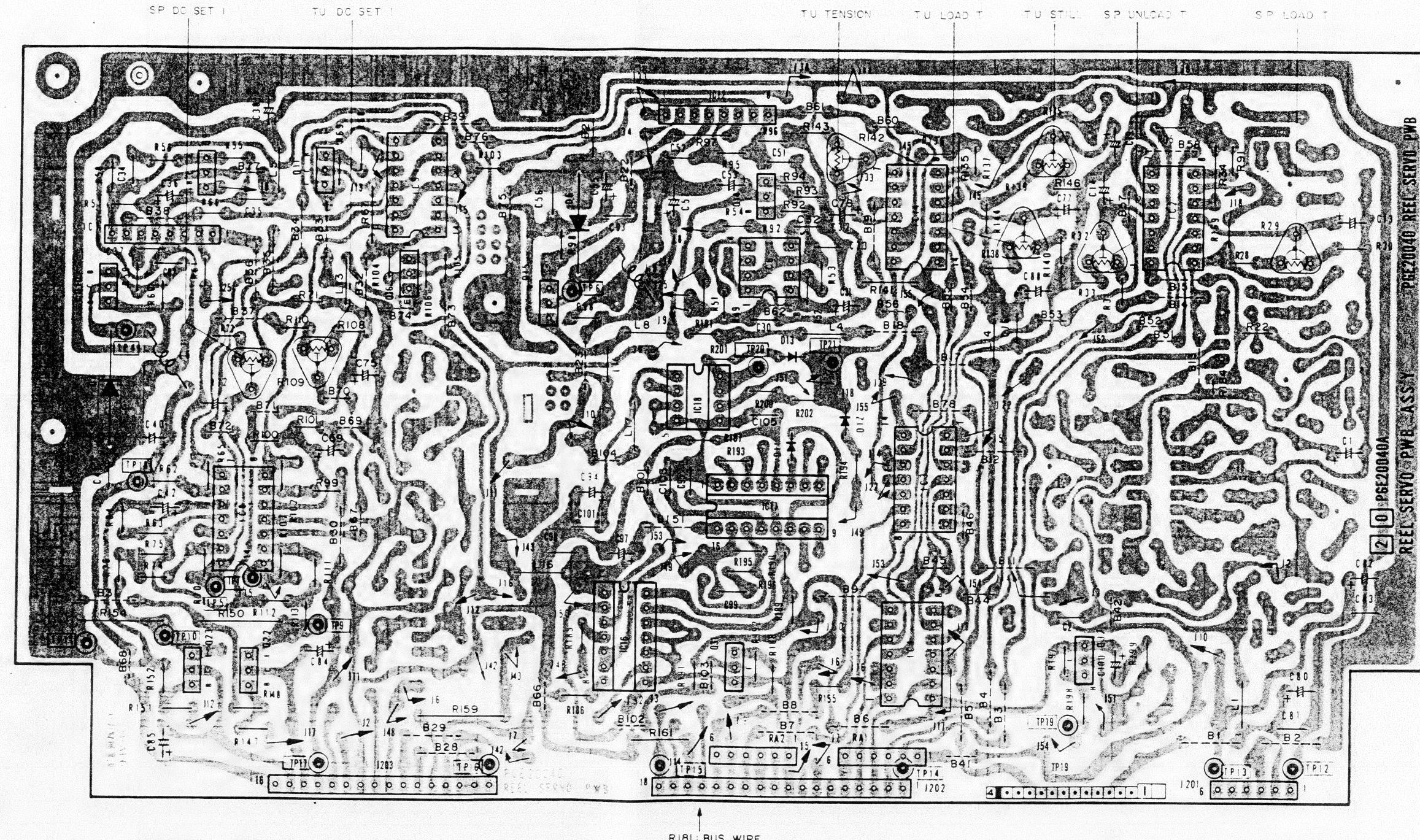
6. NPN type transistors are 2SD636BS

7. PNP type transistors are 2SB641RS
 8. All diodes are 1SS133.
 9. All capacitance values are in μF .

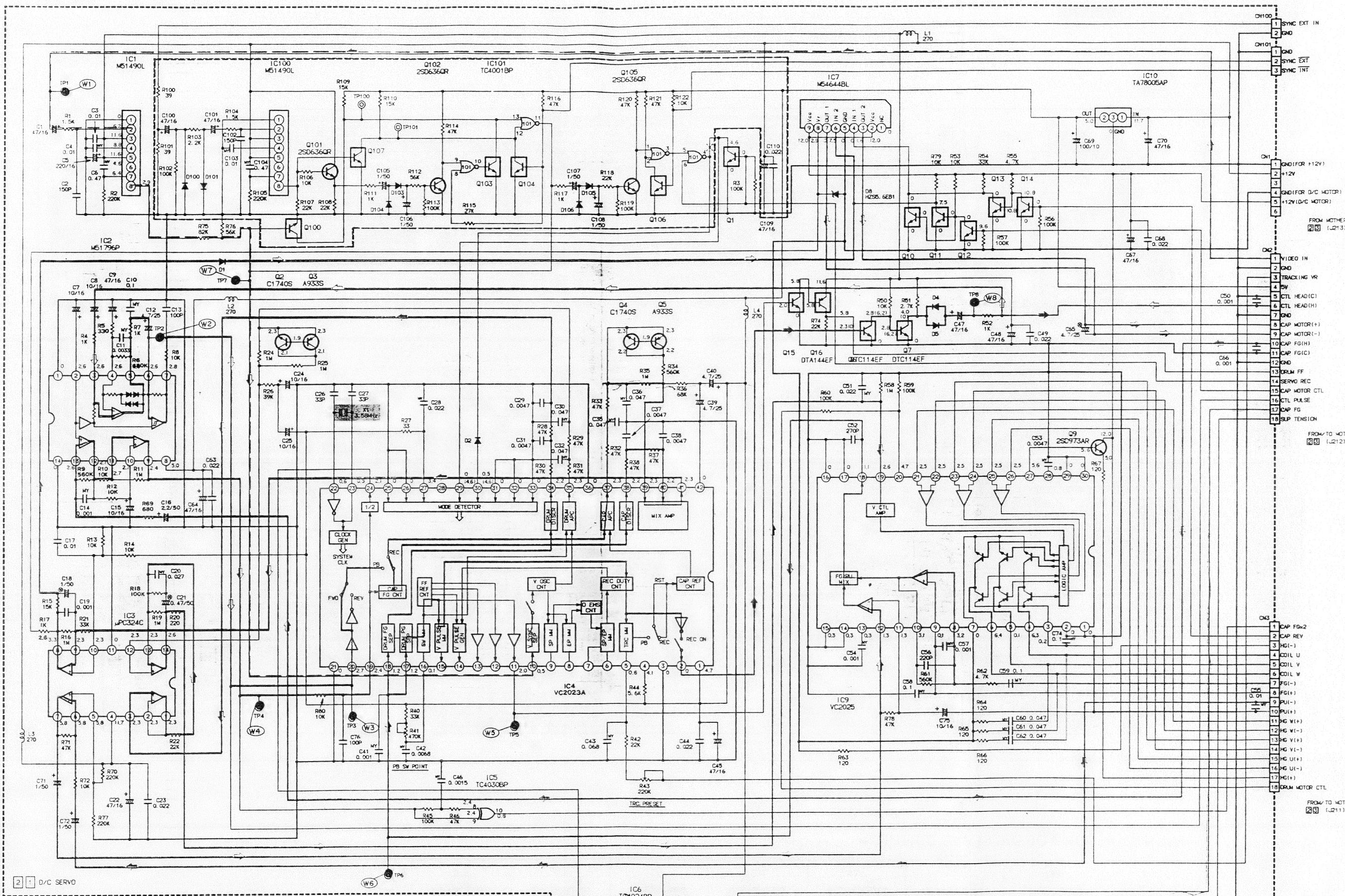
 RECORDING SIGNAL PATH
 PLAYBACK SIGNAL PATH
 REPLAY SIGNAL PATH

— MAIN WAVEFORM OF
REEL SERVO CIRCUIT —

W1	W2
TP-20 11.9 V DC	TP-6 17 Vp-p App. 20 kHz
W3	W4
TP-4 17 Vp-p App. 20 kHz	TP-5 6.0 V DC
W5	W6
TP-7 6.0 V DC	TP-13 17 V DC
W7	W8
TP-14 10.7 V DC	TP-16 1.2 V DC
W9	W10
TP-17 3.3 V DC (REC/PLAY) 2.2 V DC (STILL)	TP-9 0.2 V DC (REC/PLAY) 0.1 V DC (STILL)
W11	
TP-10 70 mV DC (REC/PLAY) 0.17 V DC (STILL)	



4.33 D/C SERVO SCHEMATIC DIAGRAM



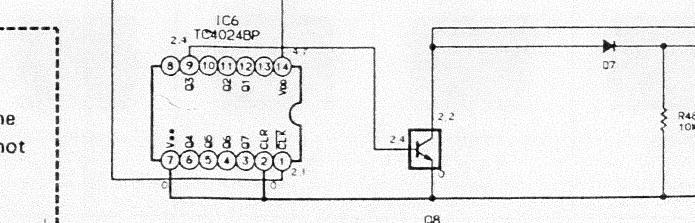
NOTES: Unless otherwise specified:

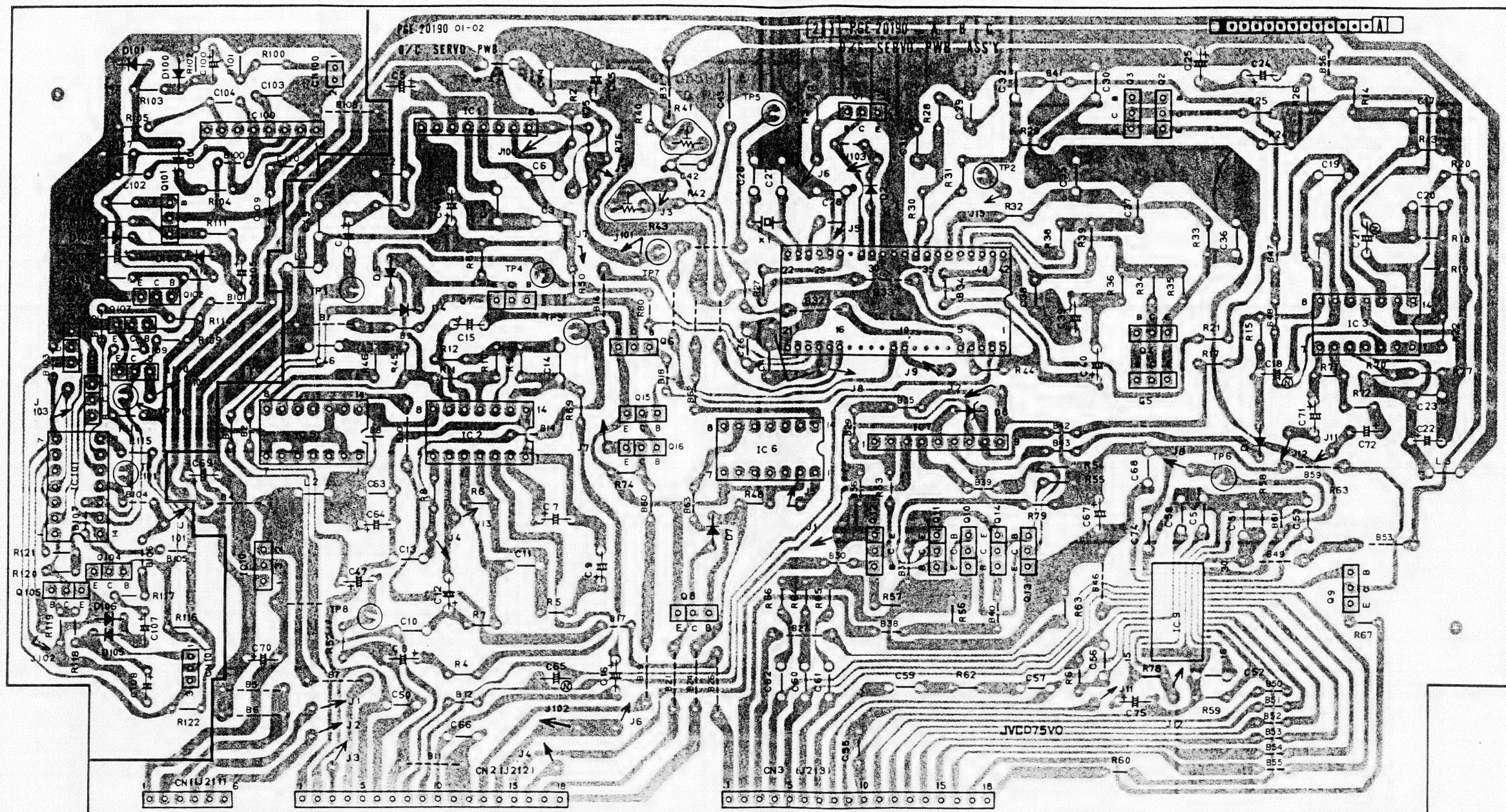
- All resistance values are in ohms. (1/6W).
- All inductance values are in μH .
- Voltages are DC-measured with a digital voltmeter during recording mode.
- Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
- Shaded parts are critical for safety. Replace only with specified part numbers.

6. All diodes are 1SS133.

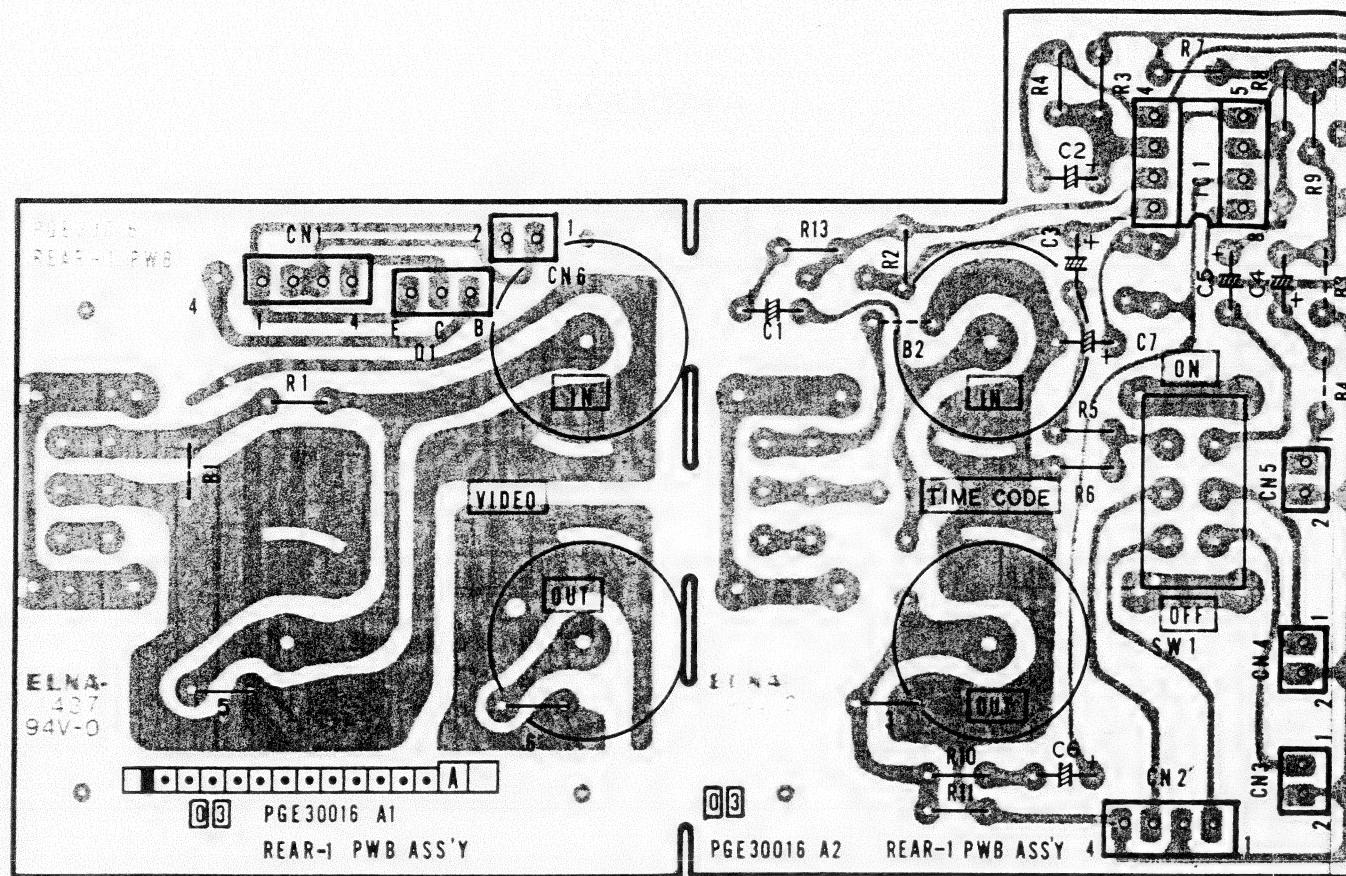
- All capacitance values are in μF .
- Since parts inside [] are of the external sync. circuit, they were not built in the set at shipment from factory.

However, the pattern work for them was finished on the board.

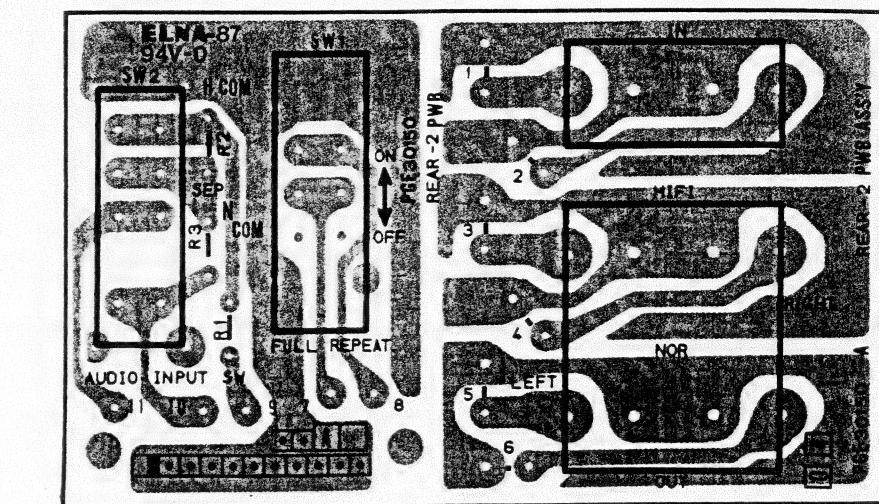




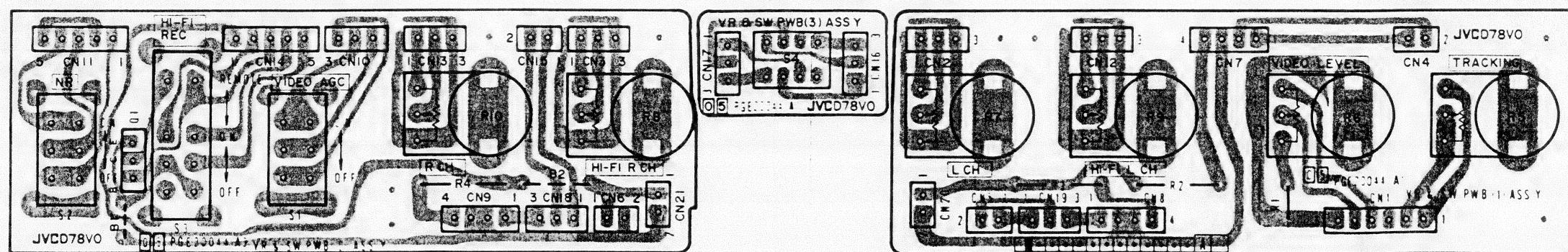
- REAR-1 -



- REAR-2

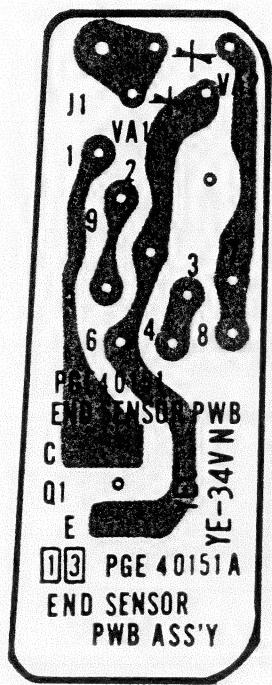


- VR & SW -

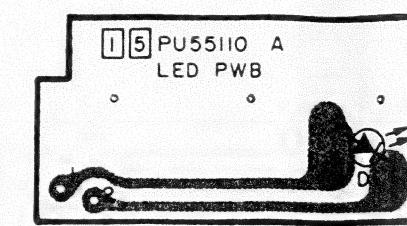


4.36 END SENSOR, CASSETTE HOUSING, LED, FRONT LED, REC LED & TERMINAL
CIRCUIT BOARDS

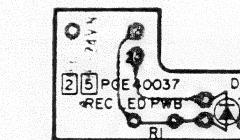
— END SENSOR —



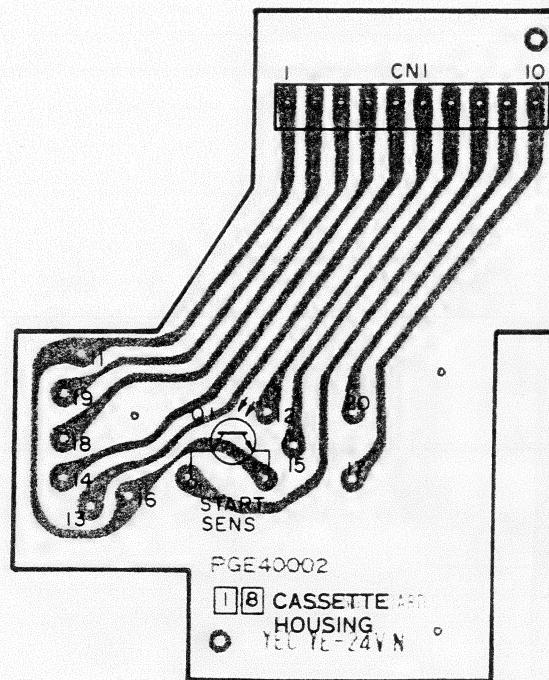
— LED —



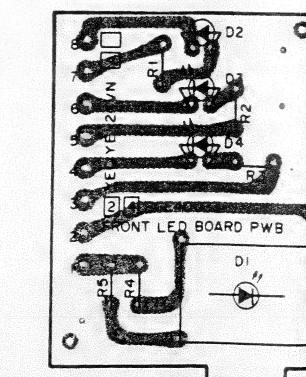
— REC LED —



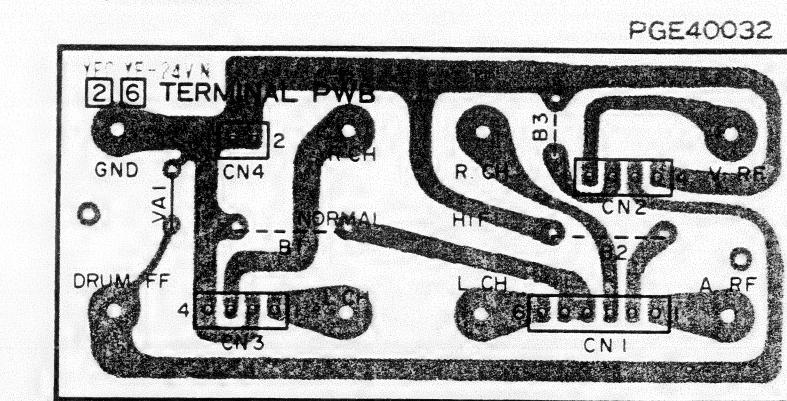
— CASSETTE HOUSING —



— FRONT LED —



— TERMINAL —



A

B

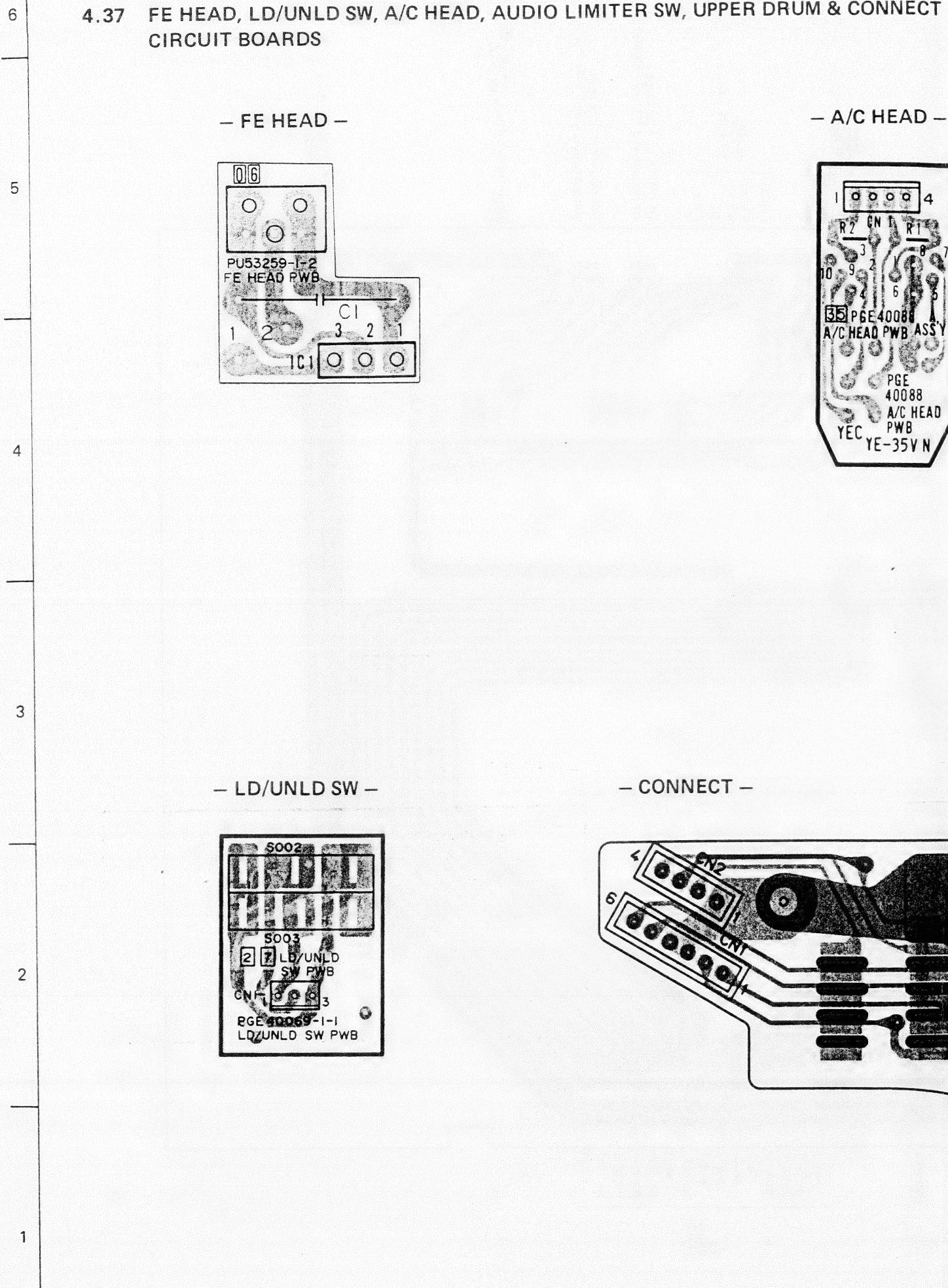
C

F

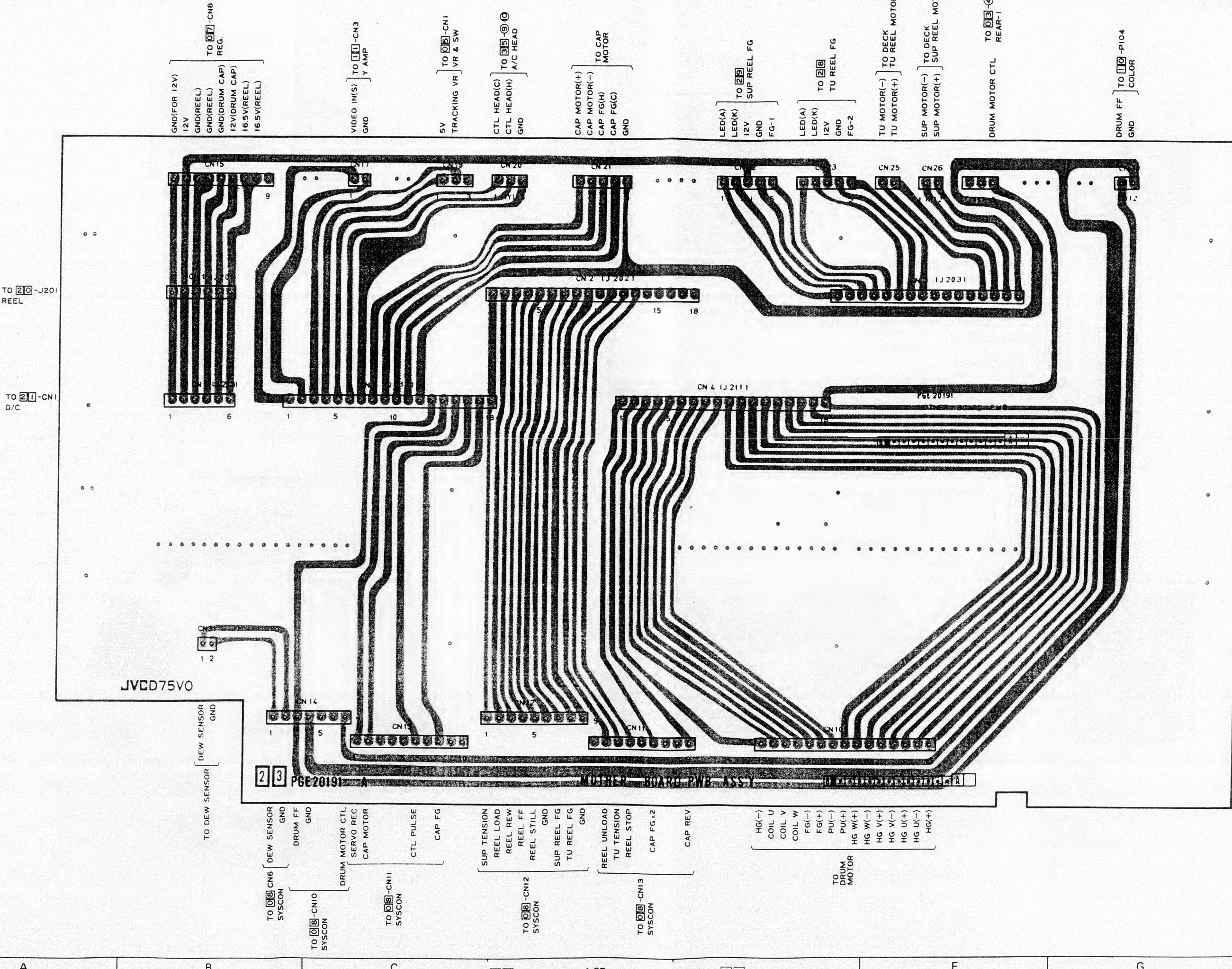
G

H

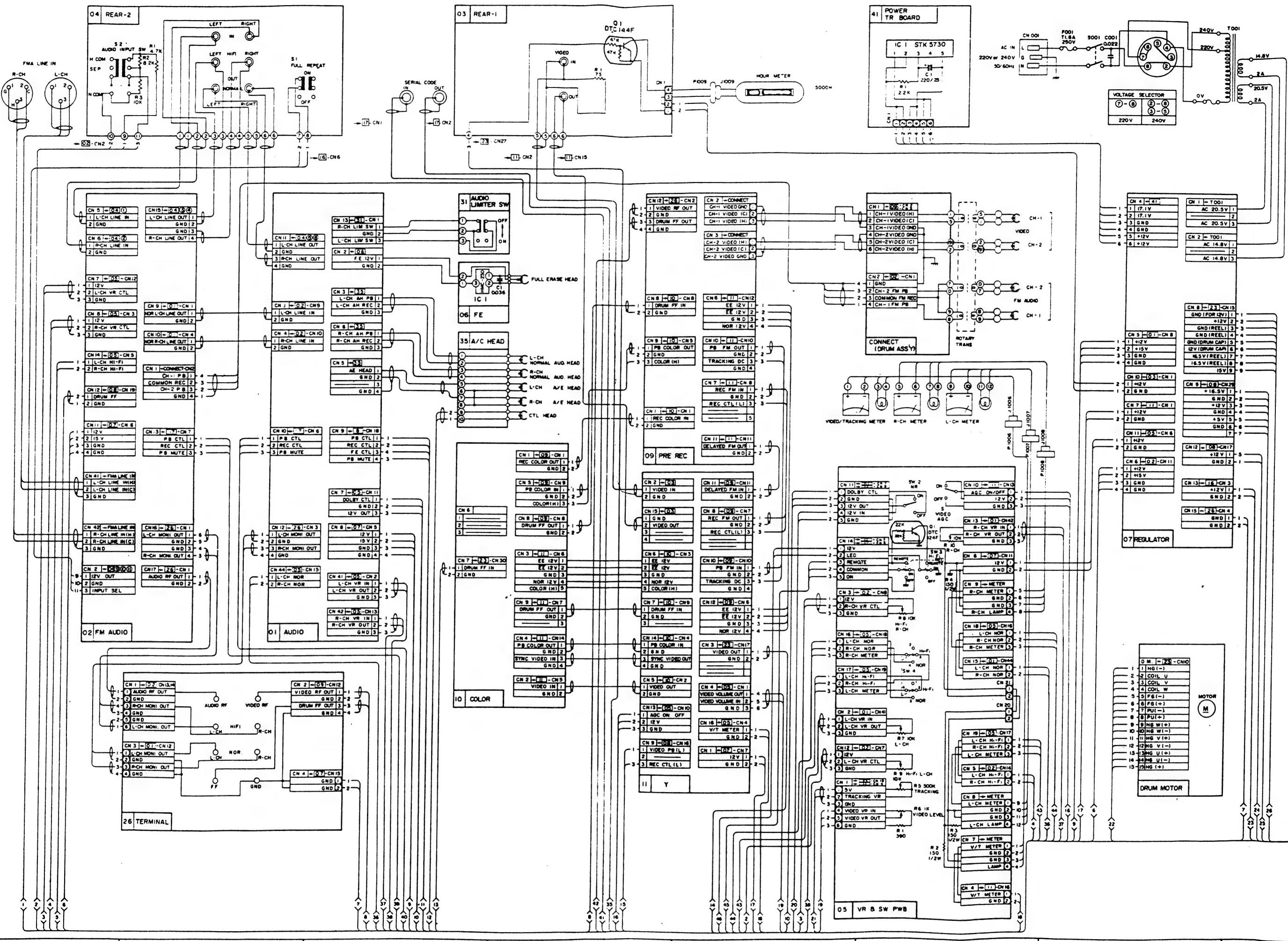
4.37 FE HEAD, LD/UNLD SW, A/C HEAD, AUDIO LIMITER SW, UPPER DRUM & CONNECT
CIRCUIT BOARDS

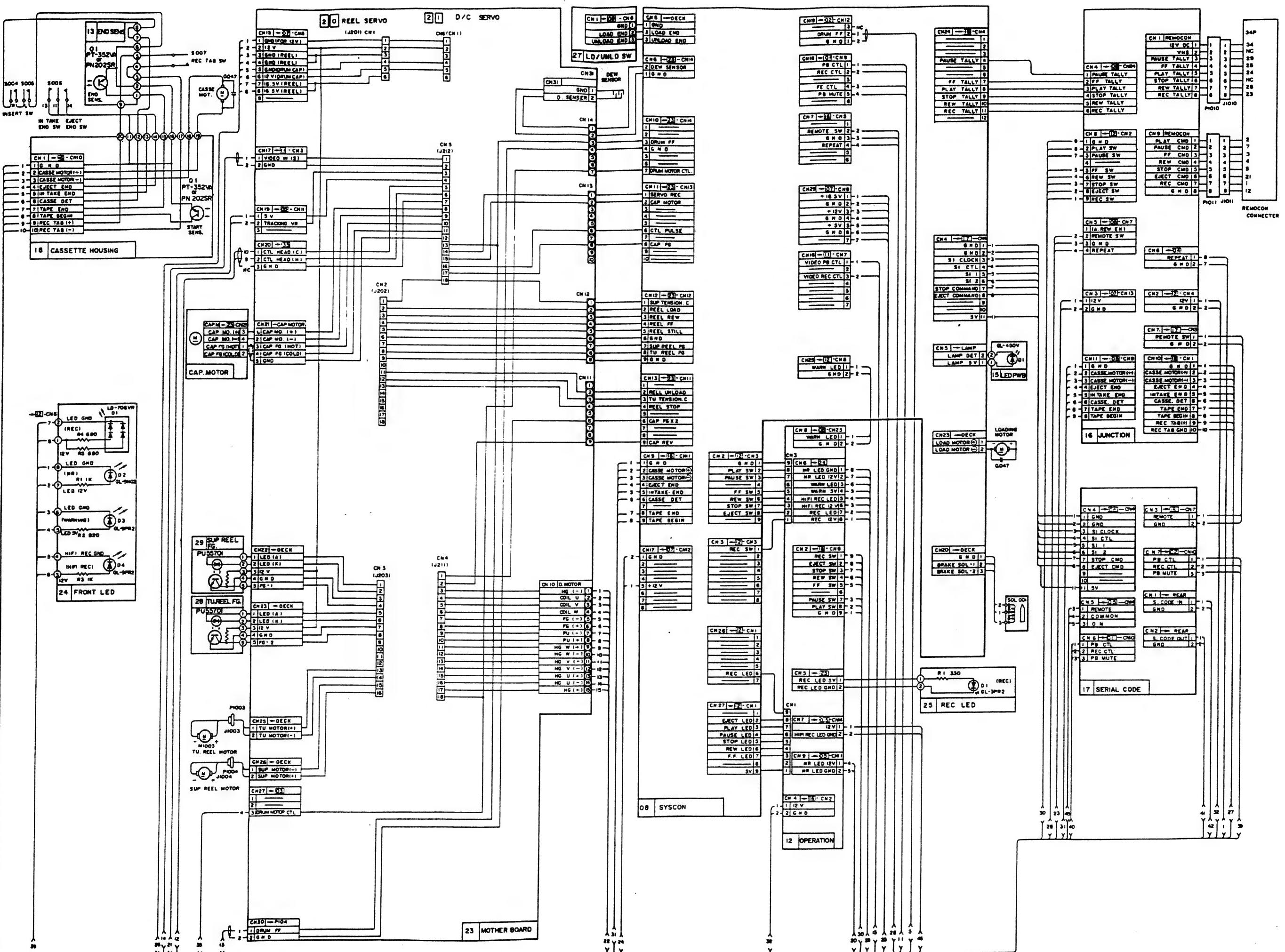


4.38 MOTHER CIRCUIT BOARD

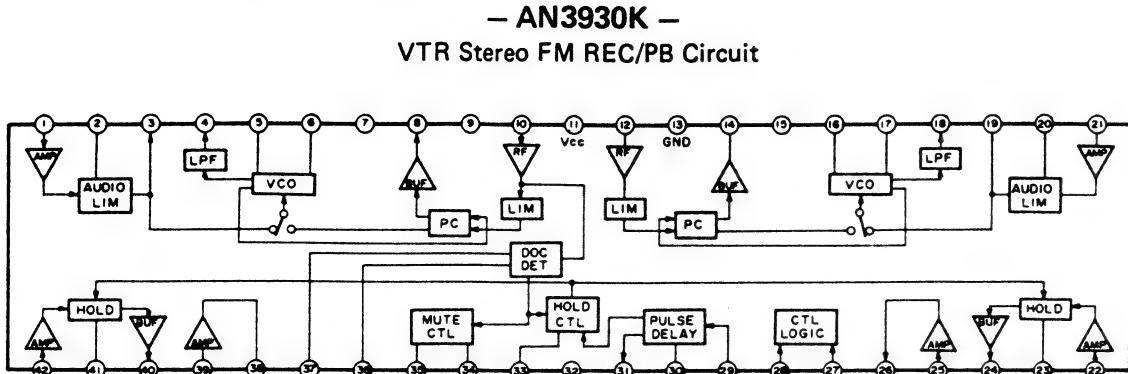


4.39 OVERALL WIRING DIAGRAM





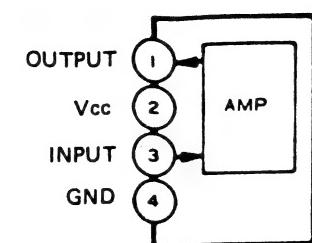
4.40 IC BLOCK DIAGRAMS



[AN3930K Terminal Description]

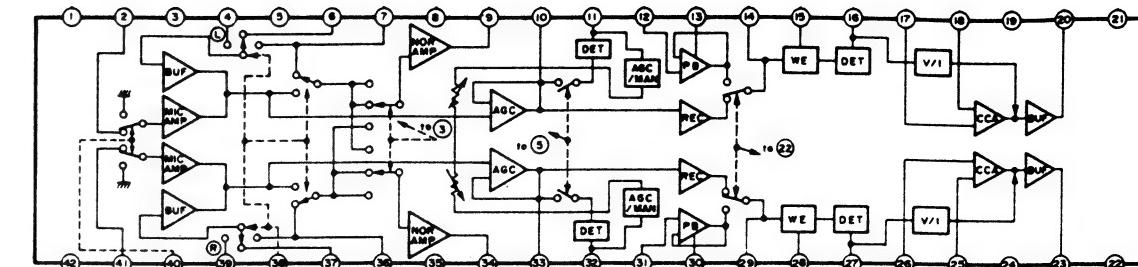
Pin No.	Description	Pin No.	Description	Pin No.	Description
1	REC IN (L)	15	VCO fo ADJ (R)	29	FF IN
2	A LIM ADJ (L)	16	VCO (R)	30	DFF ADJ
3	A LIM MON (L)	17	VCO (R)	31	DFF OUT
4	REC FM OUT (L)	18	REC FM OUT (R)	32	$\frac{1}{2}$ Vcc
5	VCO (L)	19	A LIM MON (R)	33	HOLD TIME ADJ
6	VCO (L)	20	A LIM ADJ (R)	34	MUTE CTL OUT
7	VCO fo ADJ (L)	21	REC IN (R)	35	MUTE TIME ADJ
8	FM DEMOD OUT (L)	22	HOLD IN (R)	36	DOC ADJ
9	GND (L)	23	HOLD (R)	37	DOC DET
10	RF IN (L)	24	HOLD OUT (R)	38	OUTPUT AMP OUT (L)
11	Vcc	25	OUTPUT AMP IN (R)	39	OUTPUT AMP IN (L)
12	RF IN (R)	26	OUTPUT AMP OUT (R)	40	HOLD OUT (L)
13	GND (R)	27	REC CTL	41	HOLD (L)
14	FM DEMOD OUT (R)	28	MODE CTL	42	HOLD IN (L)

- AN607P -
Wide Band Amplifier Circuit



- AN6299NK -

VTR Audio Signal Processing Circuit

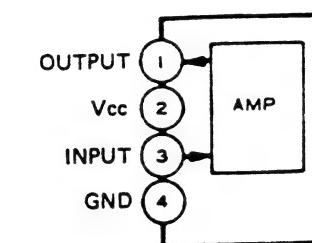


[AN6299NK Terminal Description]

Pin No.	Description	Pin No.	Description	Pin No.	Description
1	GND	14	ENCODE OUT	30	NR AMP
2	MIC (Lch) IN	15	WEIGHTING	31	PB IN
3	NORM AUDIO OUT CTL. Lch MODE H 9.8~12V Rch MODE 3.8~7.7V STEREO MODE 0~1.6V	16	NR DET OUT	32	AGC DET OUT
4	AUX (Lch) IN	17	CCA + IN	33	ELEC. VR NR
5	AGC ON/OFF ON H 5.2~12V OFF L 0~2.6V	18	CCA - IN	34	NORM AUDIO OUT
6	CAMERA (Lch) IN	19	CCA OUT	35	ELEC. VR CONTROL IN
7	TV (Lch) IN	20	MONITOR (Lch) OUT	36	TV (Rch) IN
8	ELEC. VR CONTROL INPUT	21	Vcc	37	CAMERA (Rch) IN
9	NORM AUDIO (Lch) OUT	22	REC/PB CTL. REC L 0~6.4V PB H 9.1~12V	38	INPUT SELECT CAMERA H 11.5~12V AUX MH 9.0~9.6V SC ML 5.5~6.8V TV L 0~2.8V
10	ELEC. VR NF	23	MONITOR OUT	39	AUX (Rch) IN
11	AGC DET OUT	24	CCA OUT	40	MIC OUT CTL. OFF H 10~12V Rch ON M 4.4~8.0V L. Rch ON L 0~2.5V
12	PB AUDIO (Lch) IN	25	CCA + IN	41	MIC (Rch) IN
13	NR AMP	26	CCA - IN	42	STANDARD VOLTAGE
14	NR AMP	27	NR Det.		
15	WEIGHTING	28	WAITING		
16	NR DET OUT	29	ENCODE OUT		
17	CCA + IN	30	NR AMP		
18	CCA - IN	31	PB IN		
19	CCA OUT	32	AGC DET OUT		
20	MONITOR (Lch) OUT	33	ELEC. VR NR		
21	Vcc	34	NORM AUDIO OUT		
22	REC/PB CTL. REC L 0~6.4V PB H 9.1~12V	35	ELEC. VR CONTROL IN		
23	MONITOR OUT	36	TV (Rch) IN		
24	CCA OUT	37	CAMERA (Rch) IN		
25	CCA + IN	38	INPUT SELECT CAMERA H 11.5~12V AUX MH 9.0~9.6V SC ML 5.5~6.8V TV L 0~2.8V		
26	CCA - IN	39	AUX (Rch) IN		
27	NR Det.	40	MIC OUT CTL. OFF H 10~12V Rch ON M 4.4~8.0V L. Rch ON L 0~2.5V		
28	WAITING	41	MIC (Rch) IN		
29	ENCODE OUT	42	STANDARD VOLTAGE		

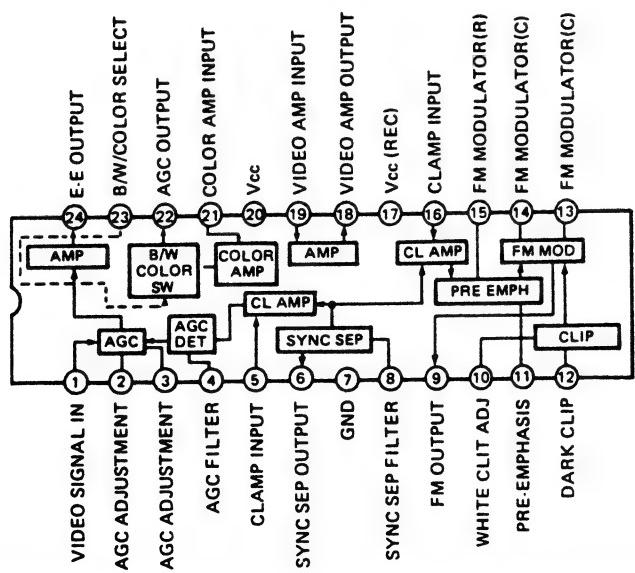
- AN608P -

Wide Band Amplifier Circuit



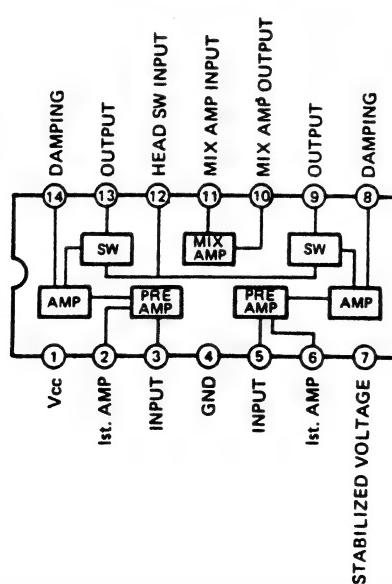
- AN6310 -

VTR Recoding Video Signal Processing Circuit



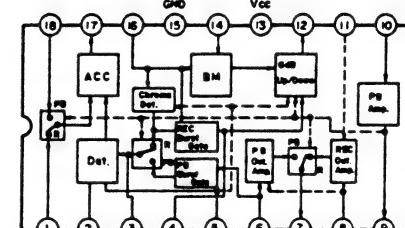
- AN6330 -

VTR Head Amplifier Circuit



- AN6360 -

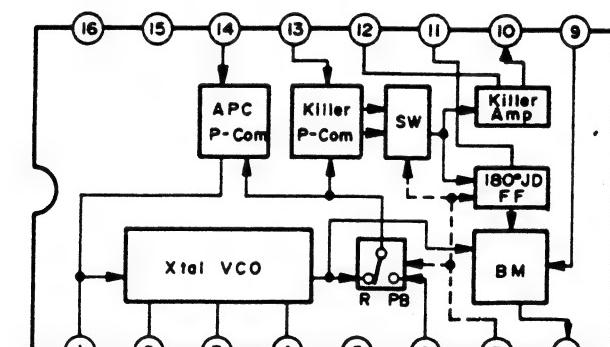
VTR Color ACC Circuit



[Terminal Description]

Pin No.	Description	Pin No.	Description
1	ACC Rec. Input	10	P.B. Amp. Input
2	Burst Detect	11	Rec. Current Select
3	Burst Output	12	B.M. Output
4	Burst Gate Pulse Input	13	Vcc
5	Chroma Select Burst	14	Carrier Input
6	6dB up/down Select	15	GND
7	Output Amp. Rec. Chroma	16	Signal Input
8	Input C/B/W Select	17	ACC Output
9	P.B. Amp. Output R/P.B. Select	18	ACC P.B. Input

- AN6361N -



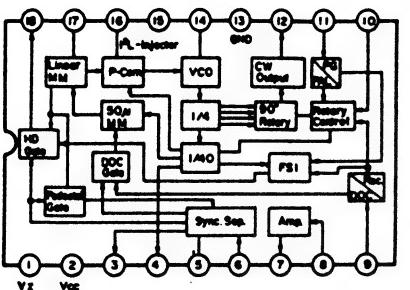
[Terminal Description]

Pin No.	Description	Pin No.	Description
1(1)	APC Filter	9(12)	630 kHz Input
2(3)	X'tal Osc.	10(13)	Killer Output
3(4)		11(15)	ID Detect
4(5)		12(16)	Killer Detect
5(6)	Vcc	13(17)	Killer Burst Input
6(7)	3.58 MHz Input	14(19)	APC Burst Input
7(9)	Rec./P.B. Select	15(20)	GND
8(11)	4.2 MHz Output		

Note: Figures in () indicate pin numbers of AN6361NS.

- AN6362 -

VTR Color AFC Circuit

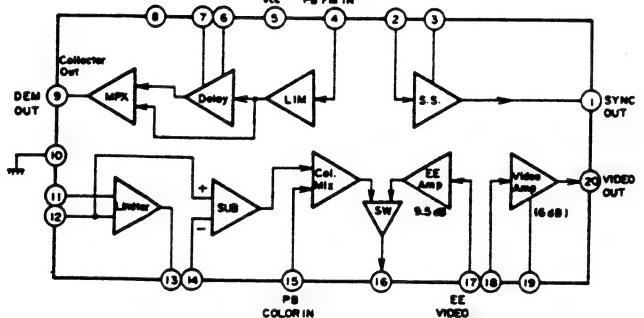
**[Terminal Description]**

Pin No.	Description	Pin No.	Description
1(1)	Zener Voltage	10(12)	ID Input
2(2)	Vcc	11(13)	PG Input (Head SW)
3(4)	Vss Output for V Sync.	12(15)	CW Output (630 kHz)
4(5)	Sync. Front Pulse Output	13(16)	GND
5(6)	Low Pass Filter	14(17)	VCO Control
6(7)	Sync. Sep. Input	15(18)	I ² L Injector
7(8)	White Clip Output	16(19)	P-Com. Filter
8(10)	Video Input	17(21)	Linear Mono. Multi.
9(11)	Rec./DOC Select	18(22)	HD-Output for Burst Gate

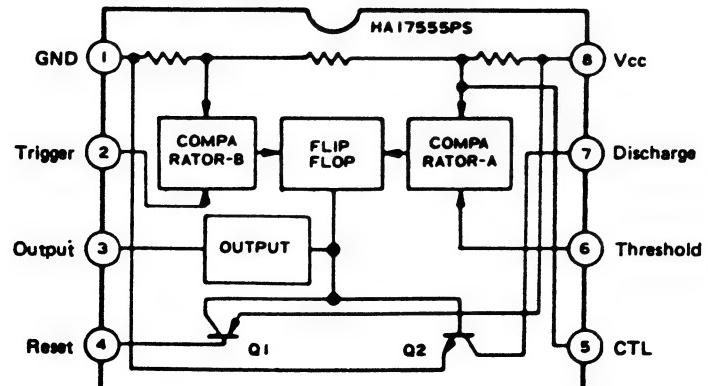
Note: Figures in () indicate pin numbers of AN6362S.

- HA11703 -

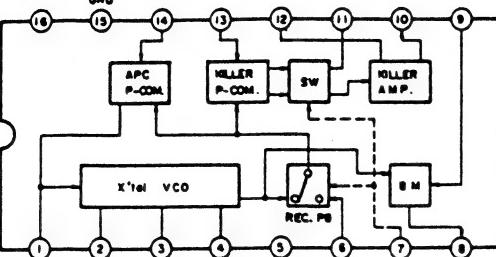
VTR FM Demodulator

**- HA117555PS -**

Precision Timer

**- AN6371 -**

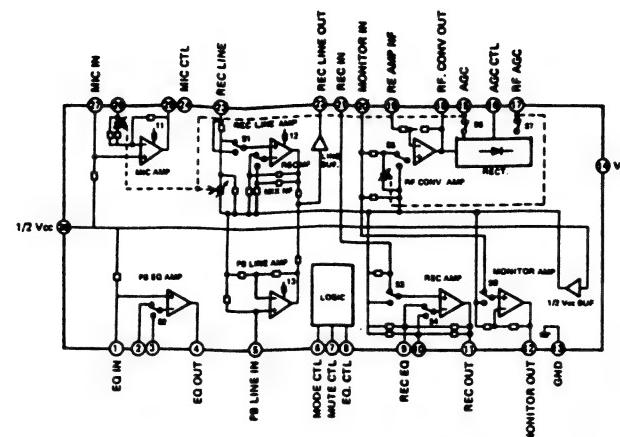
VTR Color APC Circuit

**[Terminal Description]**

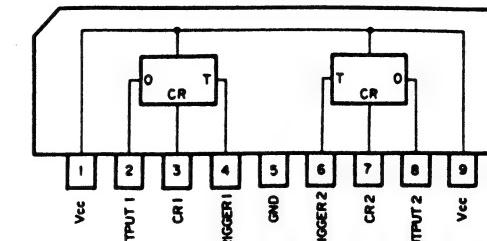
Pin No.	Pin Name	Pin No.	Pin Name
1	APC Filter	9	627 kHz Input
2	Killer Output	10	ID Input
3	X'tal Oscillator	11	ID Detect
4	Killer Detect	12	Killer Detect
5	Vcc	13	Killer Burst Input
6	4.43 MHz Input	14	APC Burst Input
7	Rec.P.B. Select	15	GND
8	5.06 MHz Output	16	Killer Filter

- AN6394 -

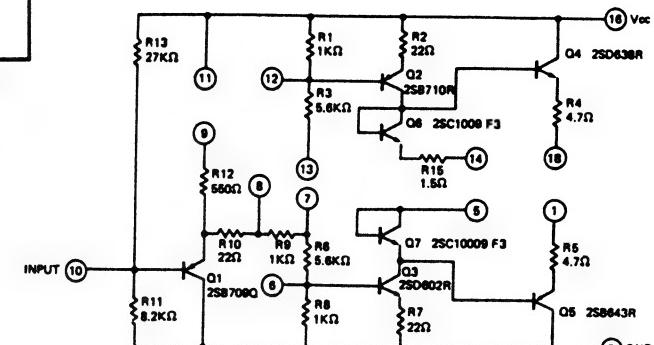
VTR Audio REC/PB Circuit

**- BA236 -**

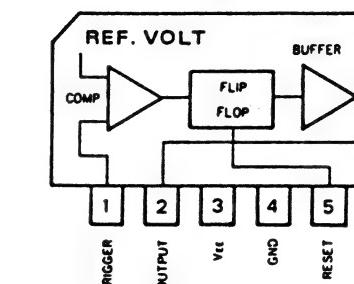
Dual Monostable Multivibrator

**- EHM-822A29 -**

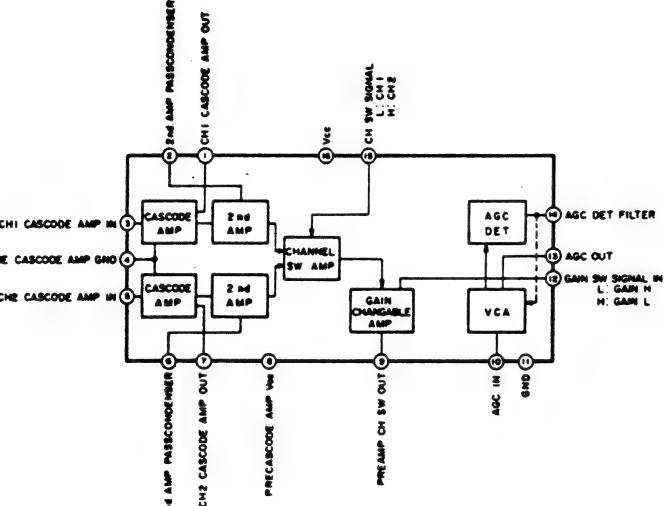
REC. AMP

**- BA634 -**

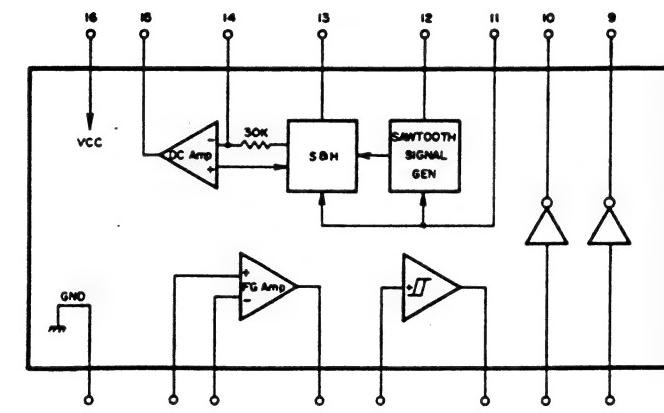
T Flip-Flop with Reset

**- HA11752 -**

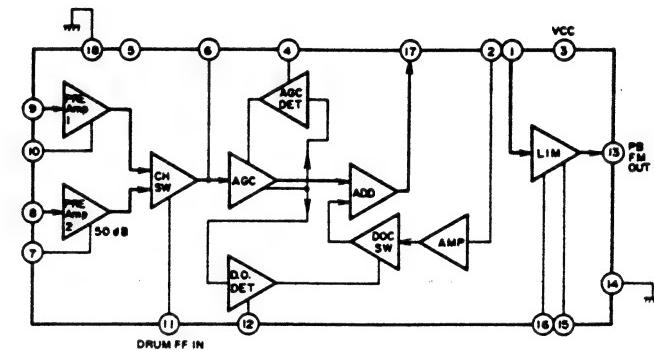
Preamplifier for FM Audio Signal

**- BA6302A -**

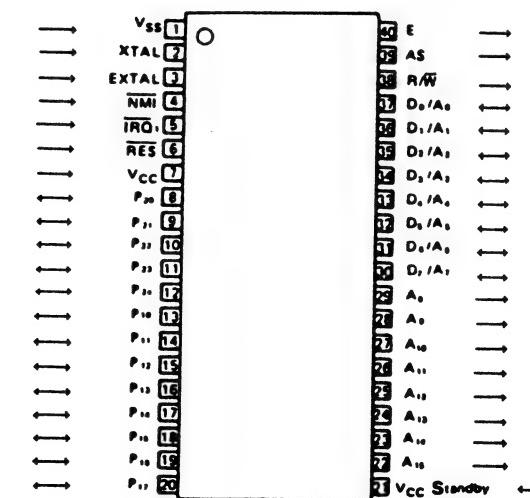
VTR Motor-Speed Control Circuit

**- HA11702 -**

VTR PB Preamplifier

**- HD6803P -**

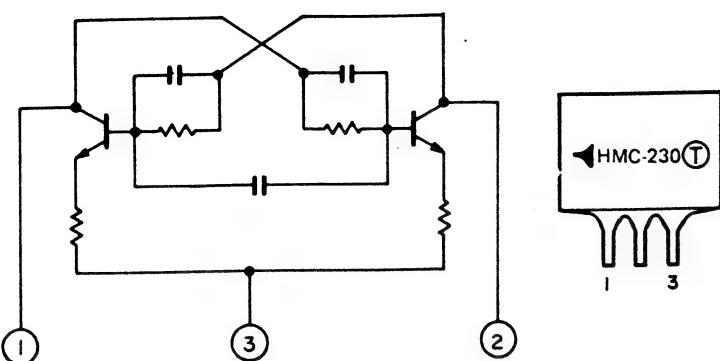
MPU (Micro Processing Unit)

**8-Stage Static Shift Register
(Asynchronous Parallel Input or Synchronous Serial Input/Serial Output)****TRUTH TABLE**

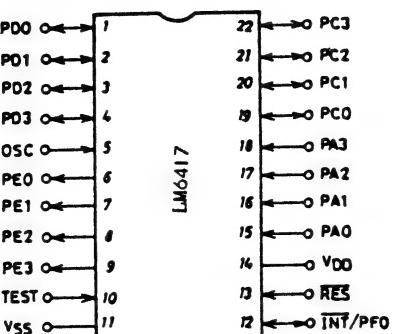
PI 8	INPUTS				OUTPUTS Δ	
	CLOCK Δ	P/S	PI _n	SI	Q ₁	Q _n
Q 6	2	15	PI 7			
Q 8	3	14	PI 6			
PI 4	4	13	PI 5			
PI 3	5	12	Q 7			
PI 2	6	11	SERIAL IN			
PI 1	7	10	CLOCK			
Vss	8	9	P/S			

Legend:
Δ : 2 ~ 8
Δ : Q₁ ~ Q₅ Internal
Δ : Level
* : Don't Care

— HMC-230 —

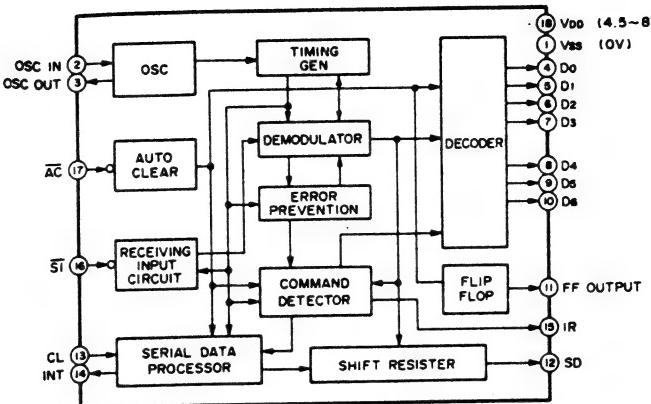


— LM6417E-297 —
Single-Chip 4-Bit Microcomputer



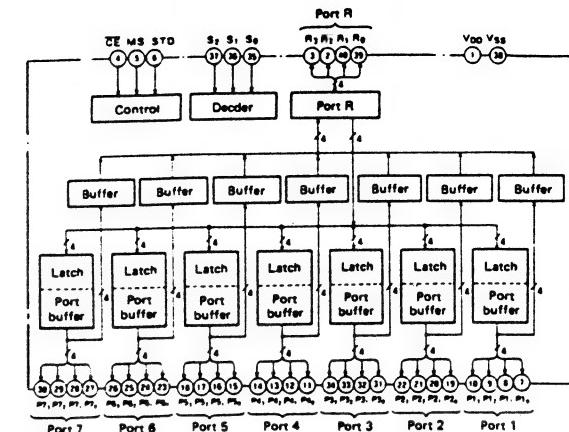
— M50117AP —

120 Function Remote-Control receiver



— M50782SP —

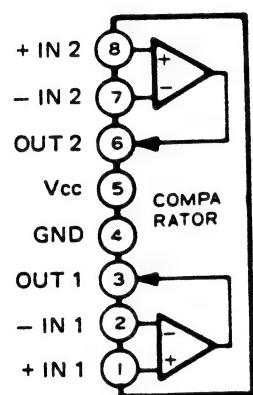
Input/Output Expander



V _{DD}	R ₁	I/O Port R
I/O Port R	R ₂	R ₃
V _{DD} (V)	S ₁	Port select IN
S ₂	S ₂	Mode select in MS
Strobe data IN/STB	S ₃	S ₃
I/O Port 1	P ₁	P ₁
P ₁	P ₁	P ₂
P ₁	P ₁	P ₃
P ₁	P ₁	P ₄
I/O Port 4	P ₂	P ₂
P ₂	P ₂	P ₅
P ₂	P ₂	P ₆
I/O Port 5	P ₃	P ₃
P ₃	P ₃	P ₇
P ₃	P ₃	P ₈
I/O Port 2	P ₄	P ₄
P ₄	P ₄	P ₉

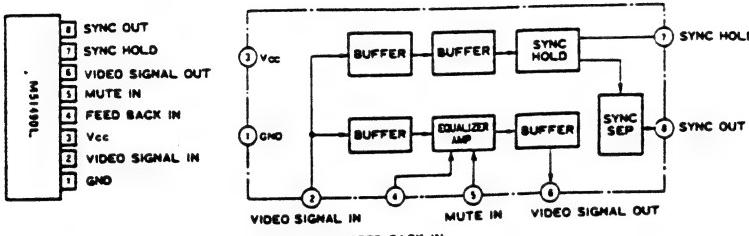
— M51207L —

Dual Comparator



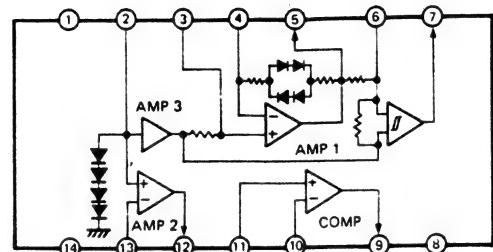
— M51490L —

Video Equalizer



— M51796P —

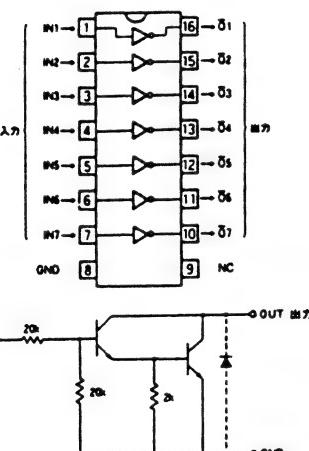
Differential Amplifier & Schmitt Trigger



[Terminal Description]

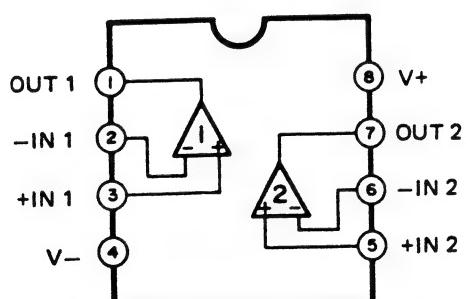
Pin No.	Description	Pin No.	Description
1	Standard Voltage	8	Vcc
2	AMP 1 + IN	9	Comparator Out
3	AMP 1 - IN	10	Comparator - In
4	AMP 1 OUT	11	Comparator + In
5	AMP 1 OUT	12	AMP 2 Out
6	Schmitt In	13	AMP 2 - In
7	Schmitt Out	14	GND 2

— M54519P —
7-Unit 400 mA Darlington Transistor Array



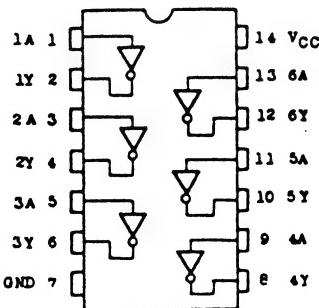
— M5218P —

Dual Low Noise Operational Amplifier



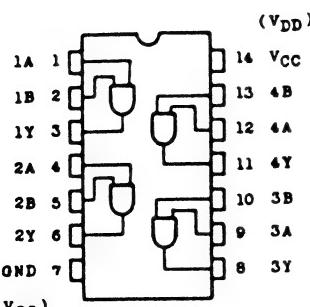
— M74LS04P —

Hex Inverter

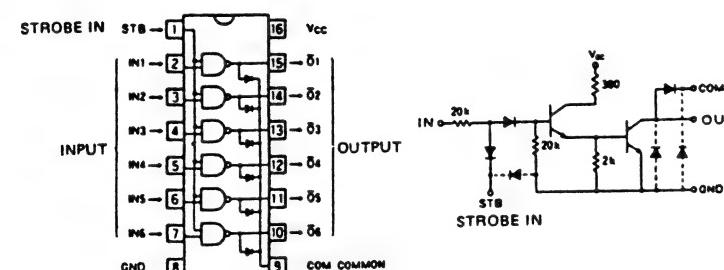


— M74LS08P —

Quad 2-Input AND Gate

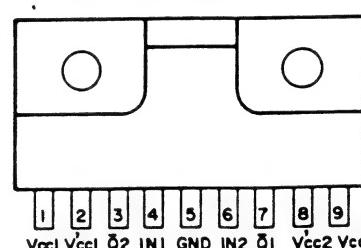


— M54533P —
6-Unit 320 mA Transistor Array with Clamp Diode and Strobe



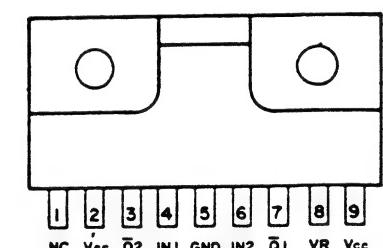
— M54544L —

Bi-directional Motor Driver



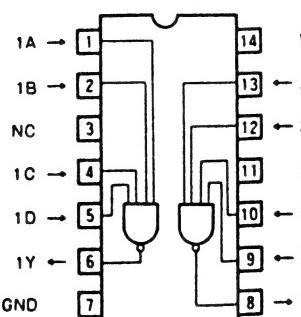
— M54644BL —

Bi-directional Motor Driver



— M74LS20P —

Dual 4-Input Positive NAND Gate



A	N	Y
L	L	H
H	L	L
L	H	H
H	H	L

N=B-C-D

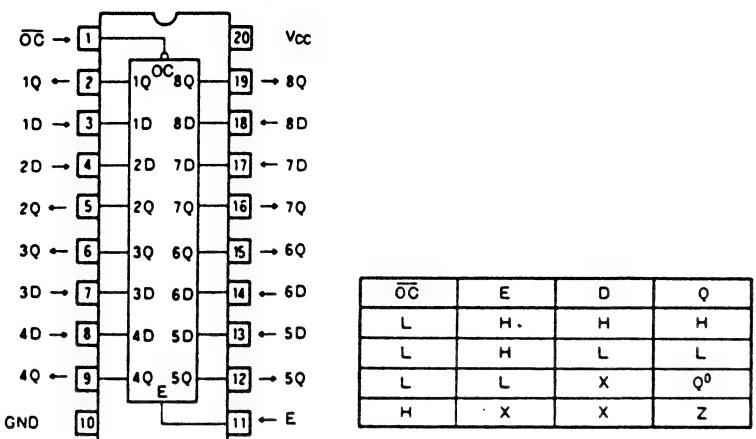
INPUT	OUTPUT	NOTE
IN1 IN2	Q1 Q2	

L L	OFF state	OFF State
H L	H L	Drive
L H	L H	Reverse
H H	L L	Brake

INPUT	OUTPUT	NOTE
IN1 IN2	Q1 Q2	

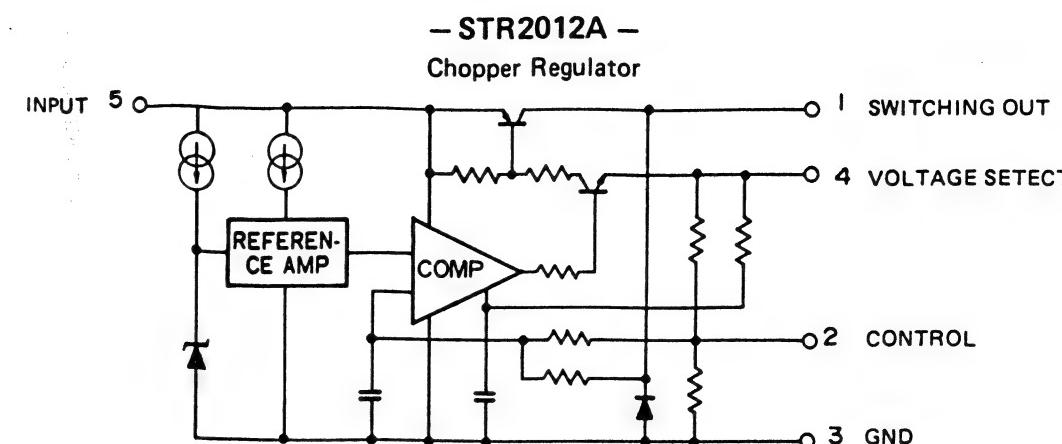
L L	OFF state	OFF State
H L	H L	Drive
L H	L H	Reverse
H H	L L	Brake

- M74LS373P -
Octal D-Type Transapent Latch With 3-State Output

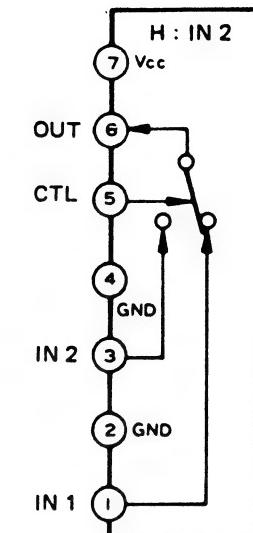


- NJM78L05D -

REGULATOR
1. INPUT
2. GND
3. OUTPUT

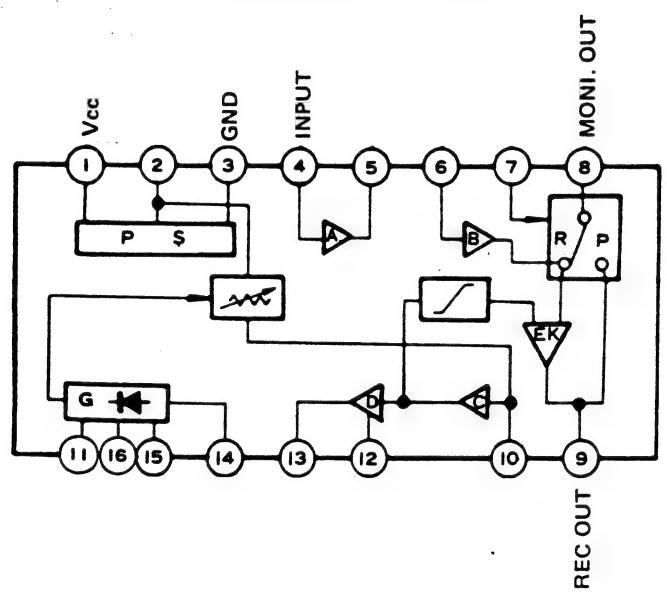


- TA7347P -
2-Input Switch



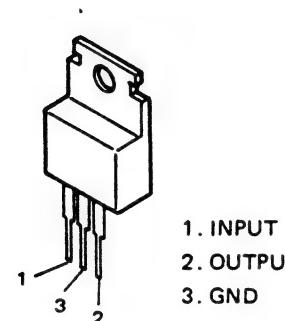
- TA7629P-A -

Dolby B Type Noise Reduction Processor

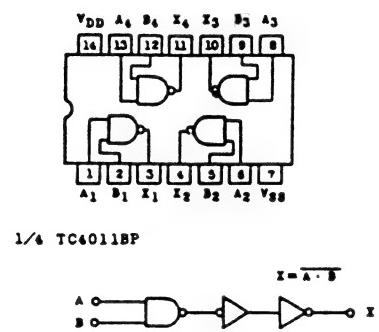


- TA78005AP -

REGULATOR

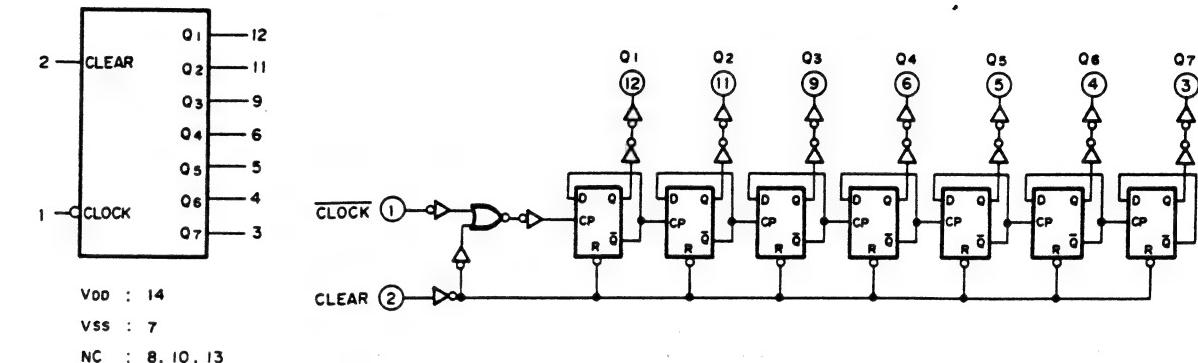


- TC4011BP -
Quad 2 Input NAND Gate

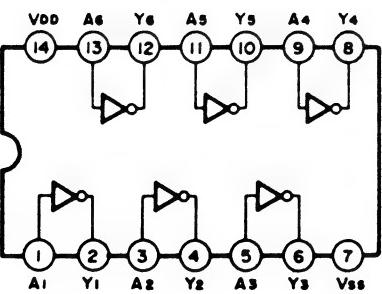


- TC4024BP -

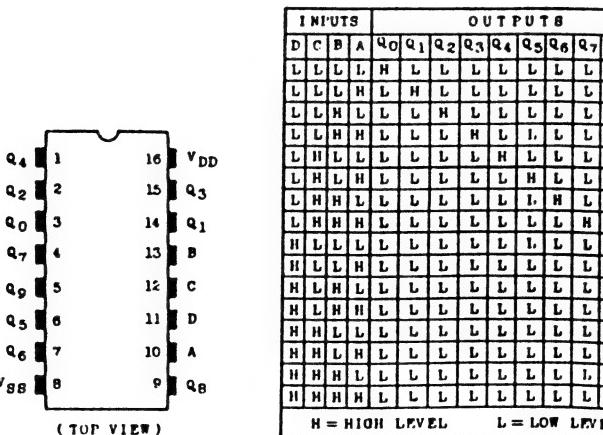
7 Stage Ripple-Carry Binary Counter/Dividers



- TC4069UBP -
Hex Inverter

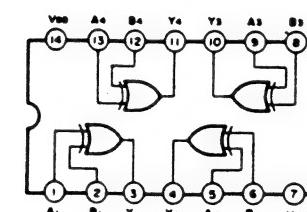


- TC4028BP -
BCD-To-Decimal Decoder

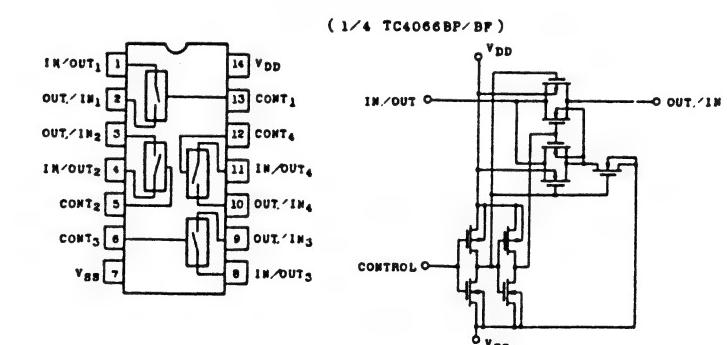


- TC4030BP -

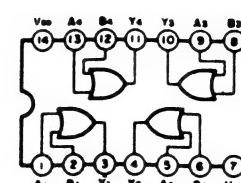
Quad Exclusive-OR Gate



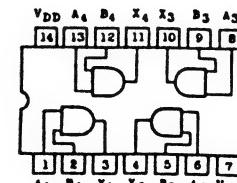
- TC4066BP -
Quad Bilateral Switch



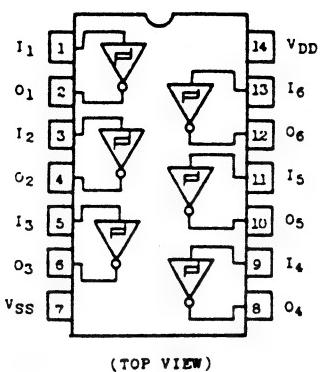
- TC4071BP -
Quan 2 Input OR Gate



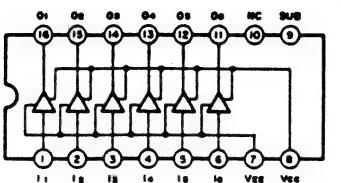
- TC4081BP -
Quan 2 Input AND Gate



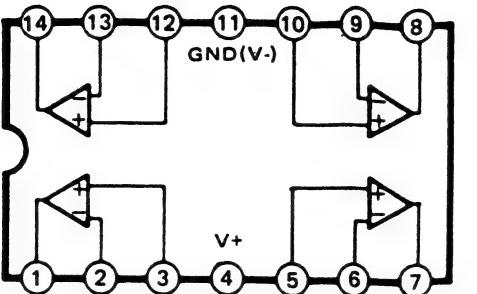
- TC4584BP -
Hex Schmitt Trigger



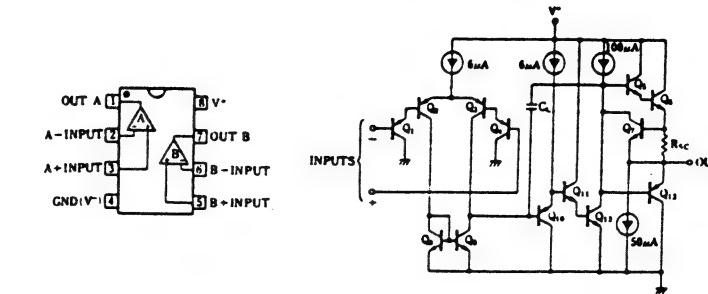
- TD62706P -
High Voltage Source Current Driver



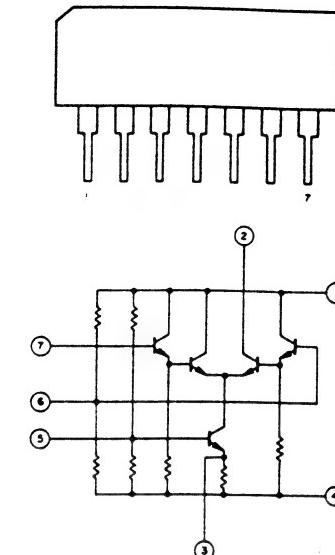
- UPC324C -
Quad Operational Amplifier



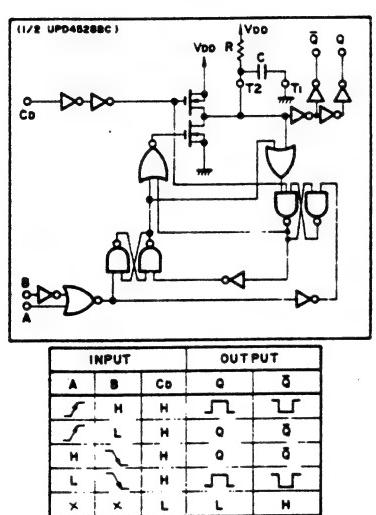
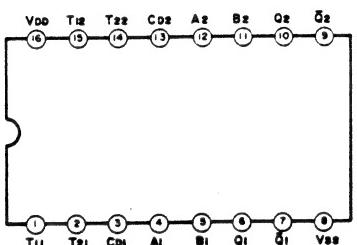
- UPC358C -
Dual General Purpose OP Amp



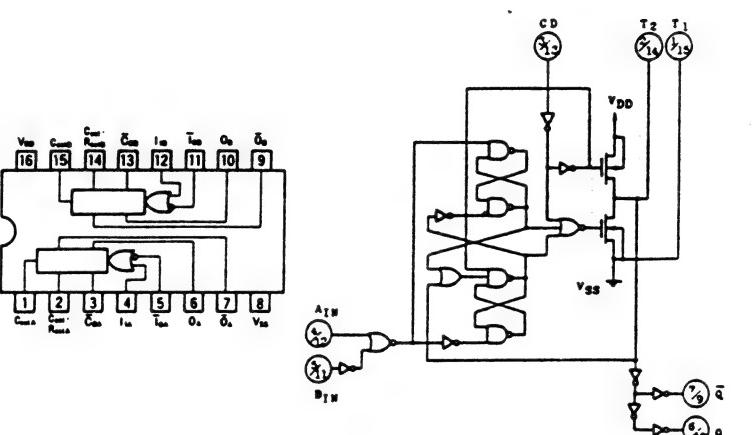
- UPC1163H -



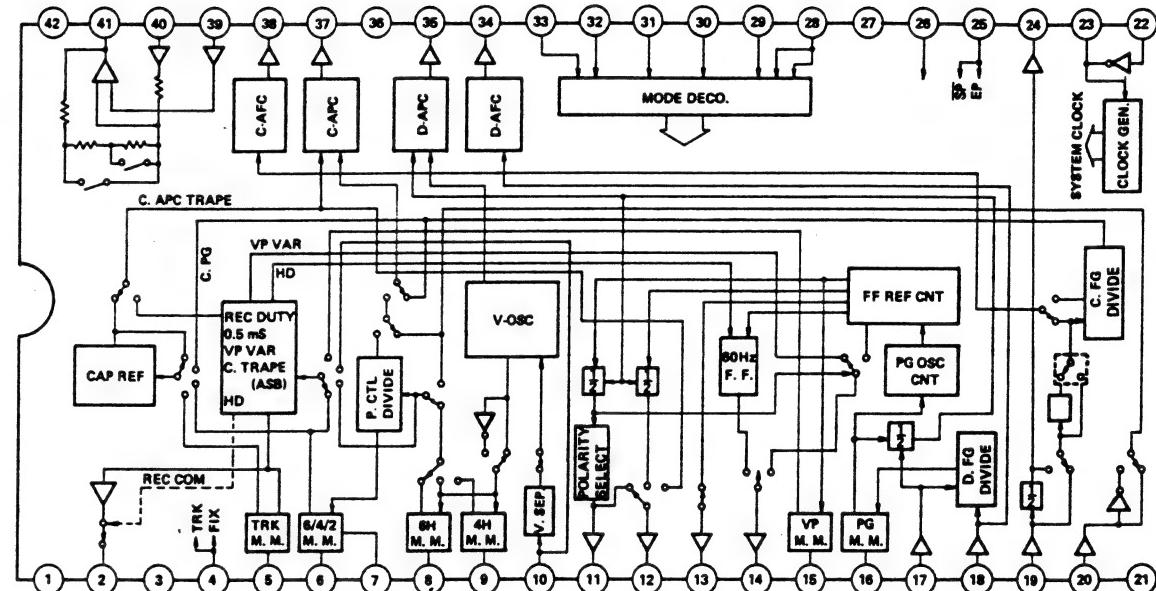
- UPD4528BC -



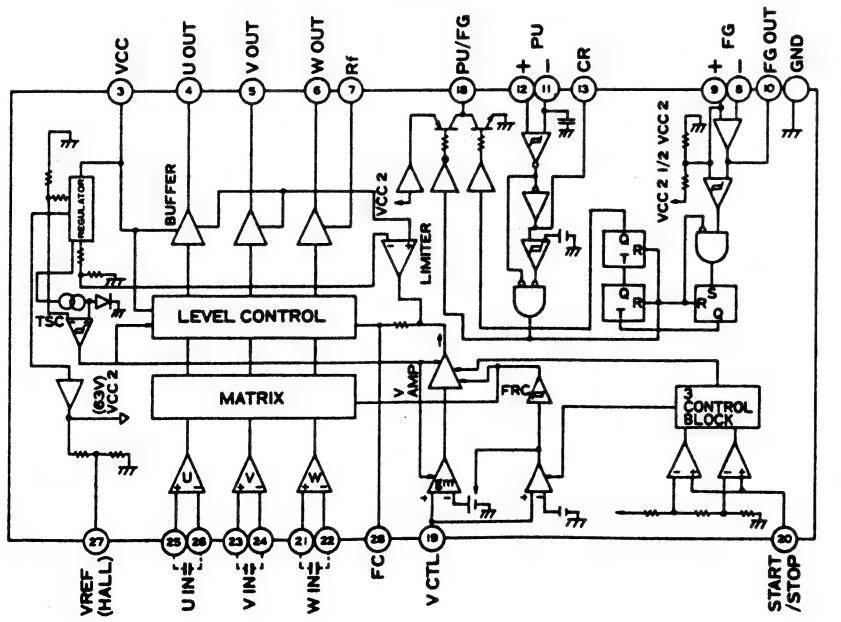
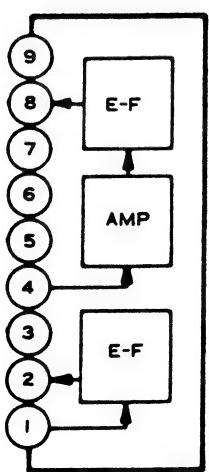
- UPD4528BC -
Dual Monostable Multivibrator



- VC2023A -
VTR Digital Servo Controller

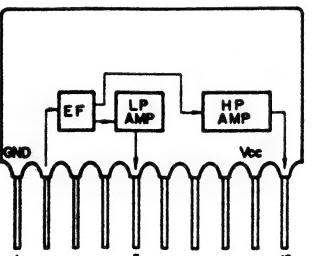


- VC2011 -



- VC 2025 -
DRUM MDA

- 10VT13 -



[Terminal Description]

Pin No.	Description	Pin No.	Description	Pin No.	Description
1	Vcc (5V)	17	DRUM PG IN	31	REV/FWD IN
2	REC CTL PULSE	18	DRUM FG IN	32	S1)
3	TEST	19	CAP FG IN	33	S2)
4	TRACKING FIX	20	CTL PULSE IN	34	DRUM APC PWM OUT
5	TRACKING DELAY	21	GND	35	DRUM APC PWM OUT
6	6/4 DELAY	22	SC IN (4.43 MHz)	36	2/D/4
7	6/4 BIAS	23	SC OUT (4.43 MHz)	37	CAP APC PWM OUT
8	6H DELAY	24	CAPSTAN FG OUT	38	CAP AFC PWM OUT
9	4H DELAY	25	6(H)/4(M)/2(L) IN	39	CAP APC MIX AMP IN
10	COMPOSITE SYNC IN	26	9H(H)/3H(L) IN	40	CAP AFC MIX AMP IN
11	DRUM FF OUT	27	IN J	41	CAP MIX AMP OUT
12	FMA FF OUT	28	V. PULSE CTL IN (H : ON)	42	GND
13	V. SYNC FF OUT				
14	V. PULSE OUT				
15	V. PULSE DELAY				
16	PG DELAY				
29	M1)				
30	M2)				

SECTION 5 EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

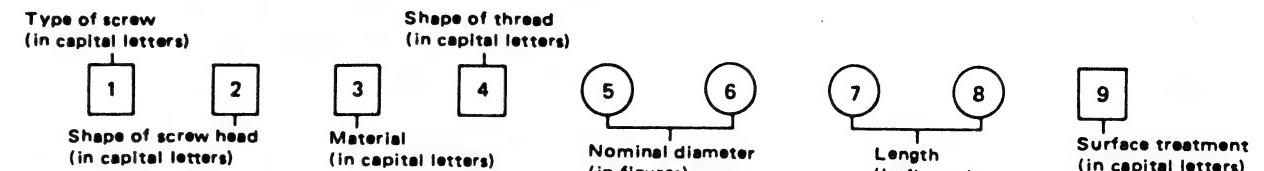
Parts identified by the  symbol are critical for safety.
Replace only with specified part numbers.

	Page
5.1 STANDARD PART NUMBER CODING	
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5.2.2 Cabinet assembly	5-4
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5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding

Standard screw part numbers are as follows.



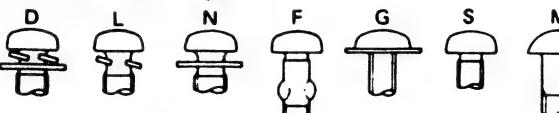
Type of screw (first digit)

- S Normal screws
- D Assembled machine screws (with plain and spring washers)
- L " (with spring washer)
- N " (with plain washer)
- F Feather screws
- G Washer head tapping screws
- M Wood screws

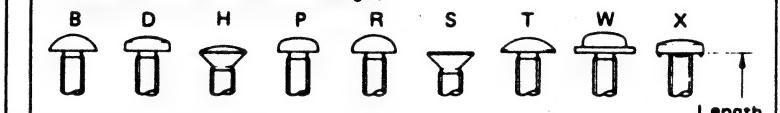
Shape of screw head (second digit)

- B Brazier head
- D Binding head
- H Oval countersunk head
- P Pan head
- R Round head
- S Flat head
- T Truss head
- W Washer head (machine screws)
- X Toothed head

-Type of screw (first digit)-



-Shape of screw head (second digit)-



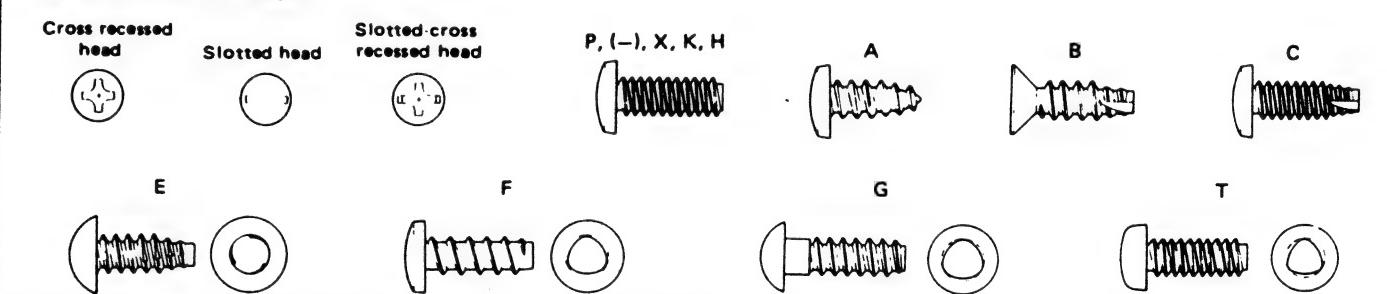
Material (third digit)

- | | |
|-------------------|-----------------|
| S Steel | N Nickel silver |
| E Stainless steel | Y Cast brass |
| C Cast iron | A Aluminum |
| U Copper | Z Zinc alloy |
| B Brass | K Polycarbonate |
| P Phosphor bronze | |

Shape of thread (fourth digit)

- P Cross recessed head screws
- (-) Slotted head machine screws
- X Slotted-cross recessed head machine screws
- K Cross recessed head machine screws for precision equipment (type 1)
- H " (type 3)
- A Cross recessed head tapping screws (type 1)
- B " (type 2)
- C " (type 3)
- E Cross recessed head special tapping screws (brand : evertight)
- F " (brand : P-tight)
- T " (brand : taptight)
- G "

- Shape of thread (fourth digit) -



Nominal diameter (fifth and sixth digits)

The fifth and sixth digits are numbers indicating a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

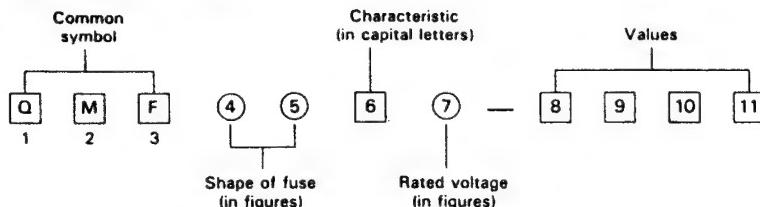
The seventh and eighth digits are numbers indicating length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

- Z Dichromate treatment after galvanizing (MFZn II-C)
- N Nickel plating (MFNi II, MFNi I)
- R Chromium plating (MBCr II, MBCr I)
- G Silver plating (SP4)
- B Black coating after plating
- F Blackening of iron (FB)
- M Blackening after galvanizing
- K Pickling of brass (PF2)
- P Phosphate treatment
- W Uni-chrome plating
- L Coating with transparent paint
- A Coloring red after galvanizing (MFZn II-C)
- C Coloring blue after galvanizing (MFZn II-C)
- T Coloring green after galvanizing (MFZn II-C)
- V Coloring purple after galvanizing (MFZn II-C)

5.1.2 Fuse coding

Standard fuse part numbers are as follows.



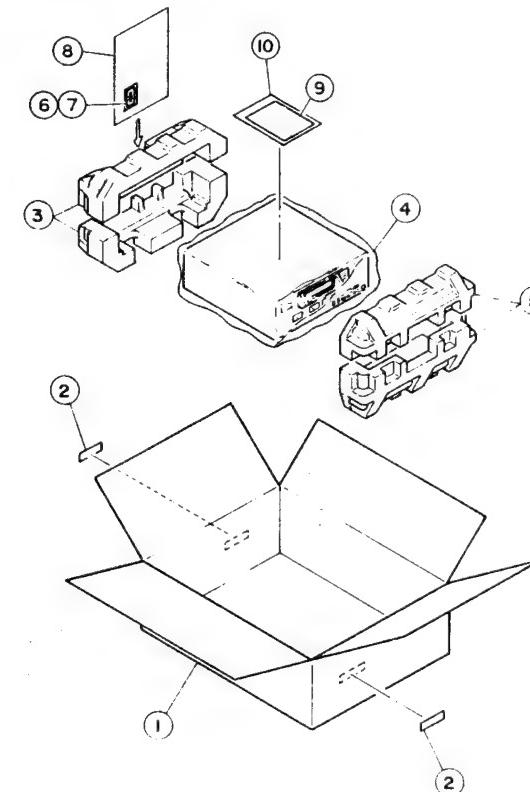
Shape of fuse (fourth and fifth digits)	Rated voltage (seventh digit)	Values (eighth-tenth or eleventh digits) example:
51 $\phi 5.2 \times 20$ mm	1 AC125 V	R63 0.63 A
60 $\phi 6.4 \times 30$ mm	2 AC250 V	1R0 1.0 A
61 $\phi 6.35 \times 31.8$ mm	3 0.1 – 1 A : AC250 V	2R5 2.5 A
63 $\phi 6.4 \times 30$ mm with lead wires	1.25 – 6.3 A : AC125 V	100 10 A
66 $\phi 6.35 \times 31.8$ mm with lead wires		R315 0.315 A
00 Special type		1R25 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

5.2 EXPLODED VIEWS AND PARTS LIST

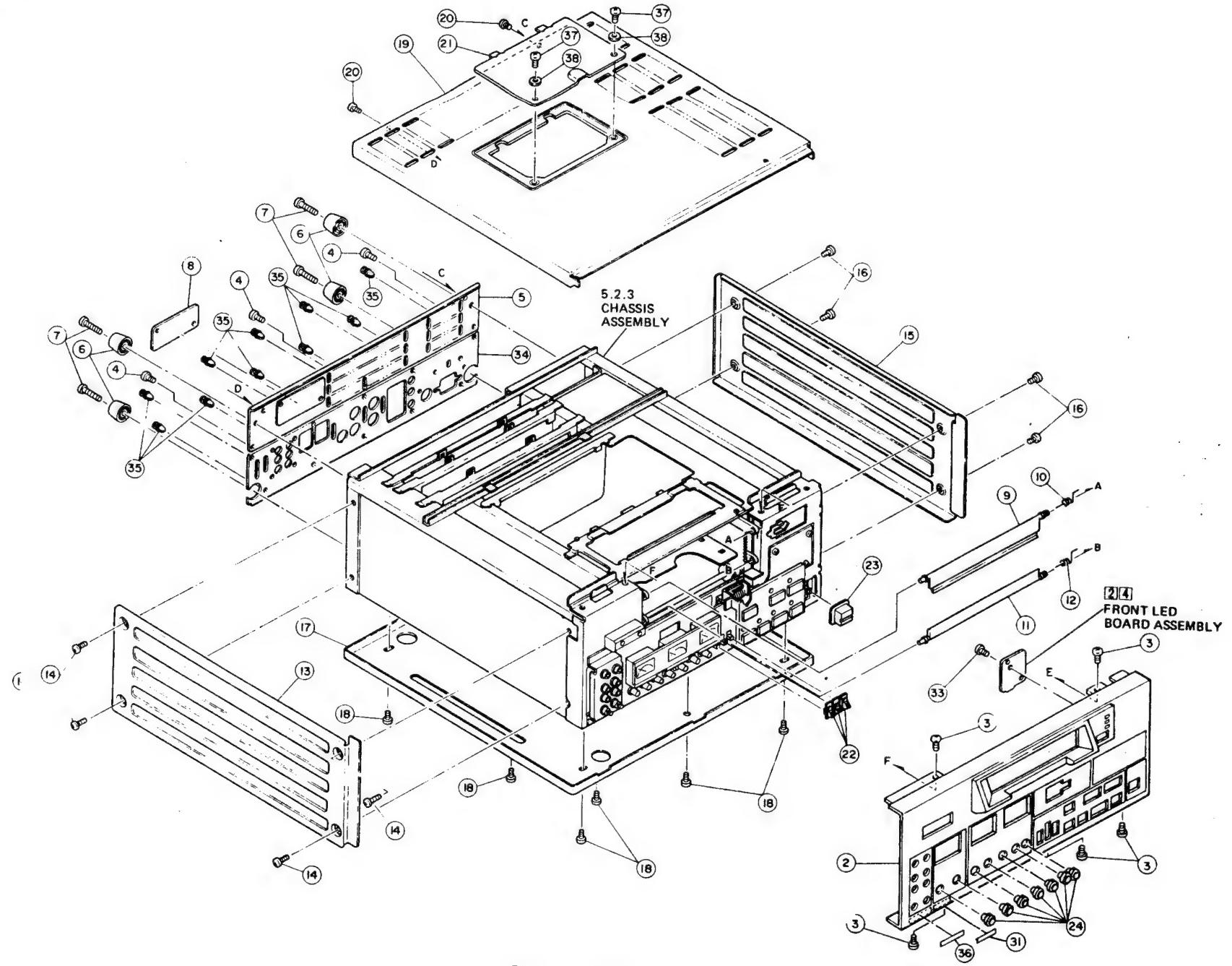
5.2.1 Packing assembly



#REF NO. PART NO. PART NAME, DESCRIPTION

* PACKING ASSEMBLY *

1	PGD20025-25	PACKING CASE
2	PUP40619	SERIAL NO. STICKER, X2
3	PGD10014-1-2	REAR CUSHION
4	PUM30021-24	POLY BAG
5	PGD10013-1-2	FRONT CUSHION
6	PGZ00124	HOUR METER
7	PUP40003-10	AIR CAP
8	QPGB020-02804	POLY BAG
9	PGD30002-116	INSTRUCTIONS
10	QPGB024-03404	POLY BAG

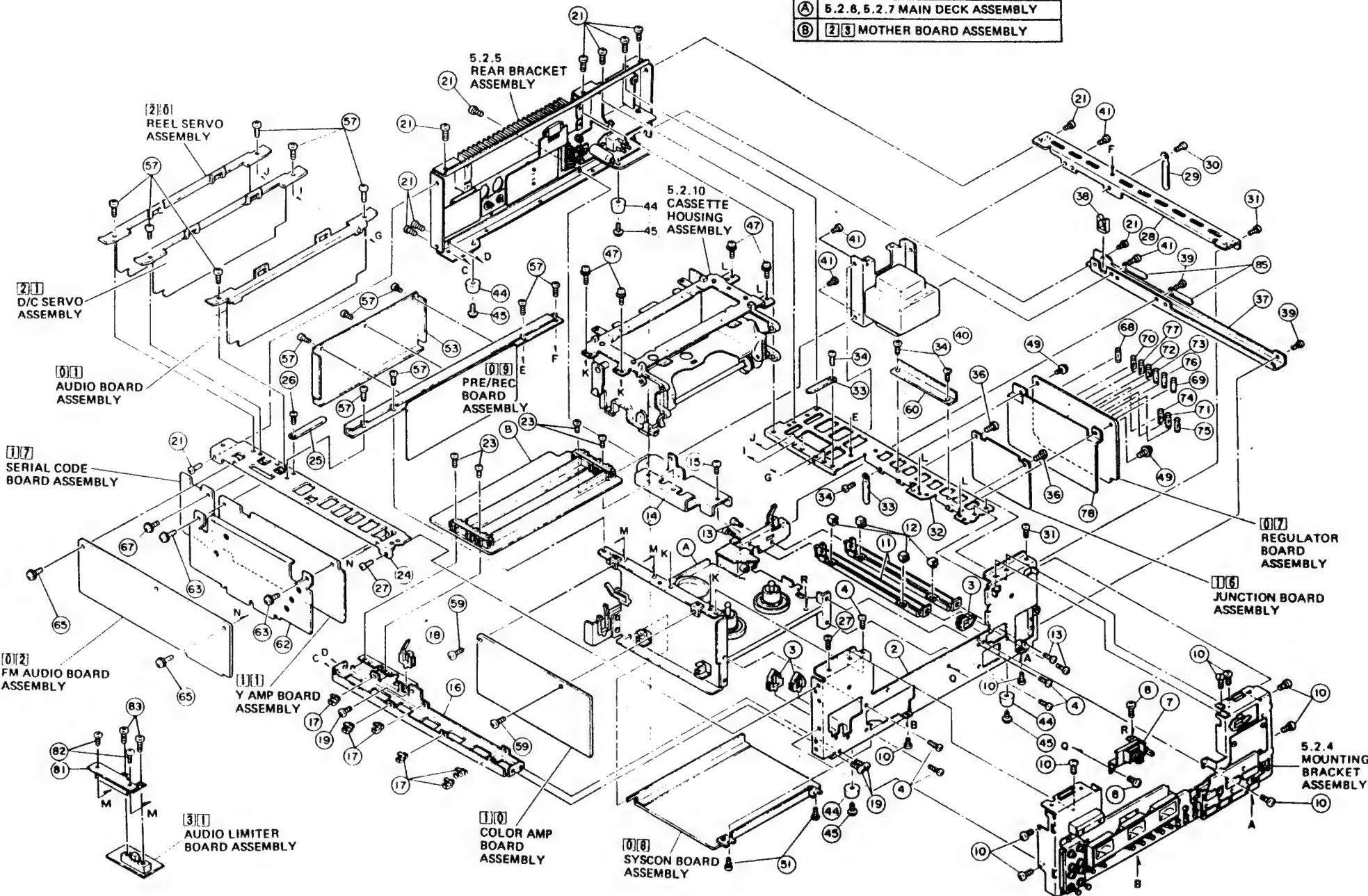


*△	REF NO.	PART NO.	PART NAME, DESCRIPTION

			* CABINET ASSEMBLY *

2	PGD10027L	FRONT PANEL ASSY	
3	SDBP3006R	SCREW, X5	
4	SDBP3006M	SCREW, X3	
△ 5	PGD20026	REAR PANEL	
△ 6	QZF2319-001	FOOT, X4	
7	SDBP4018M	SCREW, X4	
8	PGD30018-22	SERIAL NO.PLATE	
9	PQ30107AA-19	U.Door ASS'Y	
10	PQ40104-2	U.TOR.SPRING	
11	PQ30030-2-15	L.DOOR	
12	PQ40472	L.TOR.SPRING	
△ 13	PGD20007	L.SIDE PANEL	
14	SDBP4006R	SCREW, X4	
△ 15	PGD20008	R.SIDE PANEL	
16	SDBP4006R	SCREW, X4	
△ 17	PU10364-04	BOTTOM COVER	
18	SBSF3006Z	TH.TAP.SCREW, X6	
△ 19	PGD20034A-1	TOP COVER ASSY	
20	SDBP3006R	SCREW, X2	
21	PGD30155-1-2	COVER	
22	PGD40023	SLIDE KNOB, X3	
23	PGD40026	PUSH KNOB	
24	PU52482	VR KNOB, X7	
△ 31	TJL-000420	STICKER	
33	SBSF2606Z	SCREW	
△ 34	PGD20027-4-6	CONNECTOR PANEL	
35	PGZ00136	PLASTIC RIVET, X10	
36	PQ40111-1-5	SERIAL NO PLATE	
37	SDBP3006R	SCREW, X2	
38	PUM30017-6	SPACER, X2	

(A)	5.2.6, 5.2.7 MAIN DECK ASSEMBLY
(B)	2 3 MOTHER BOARD ASSEMBLY



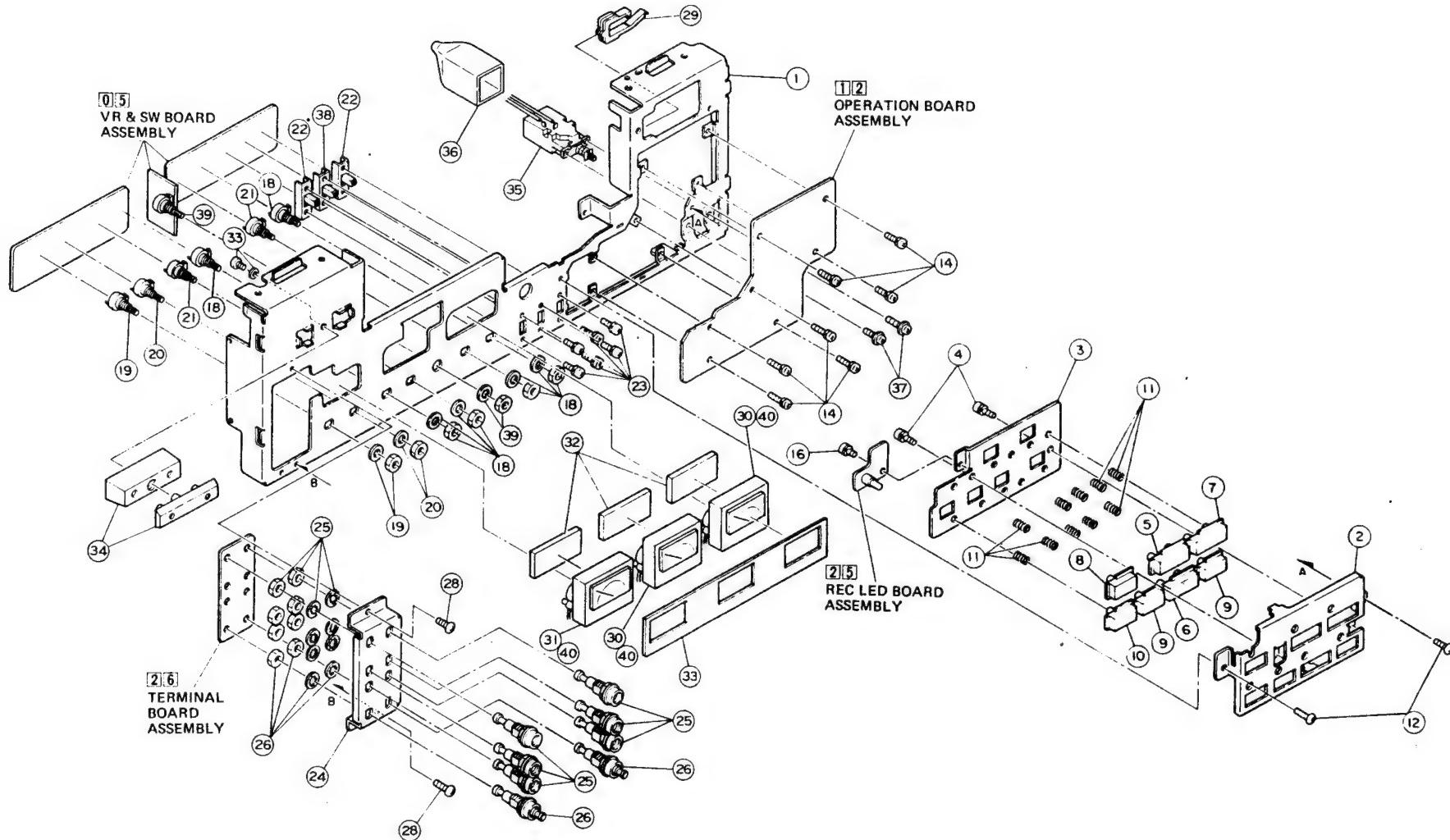
#	REF NO.	PART NO.	PART NAME, DESCRIPTION

*		CHASSIS ASSEMBLY	*

2	PGD10015B-3	FRONT BRACKET ASSY	
△ 3	PU49881	EDGE COVER, X3	
4	SBST3006Z	TH.TAP.SCREW, X5	
7	PGZ00112	COUNTER	
8	SBST3006Z	TH.TAP.SCREW, X2	
10	SBST3006Z	TH.TAP.SCREW, X11	
11	PU33027A-06	POWER PWB STAY ASSY, X2	
△ 12	PU47876	PWB HOLDER, X4	
13	SBST3006Z	TH.TAP.SCREW, X4	
14	PGD30115A-1	CENTER BRACKET (B) ASSY	
15	SBST3006Z	TH.TAP.SCREW	
16	PGD20017A-2	L.LOWER STAY ASSY	
17	PU47876	PWB HOLDER, X6	
△ 18	PU49881	EDGE COVER	
19	SBST3006Z	TH.TAP.SCREW, X3	
21	SBST3006Z	TH.TAP.SCREW, X11	
23	SBST3008Z	TH.TAP.SCREW, X4	
24	PU21514B-4	L.UPPER STAY ASSY	
△ 25	PU49485-2	WIRE CLAMP	
26	SBST3006Z	TH.TAP.SCREW	
27	SBST3006Z	TH.TAP.SCREW, X2	
28	PU21586A-2	R.UPPER STAY ASSY	
29	PU49485	WIRE CLAMP	
30	SBST3006Z	TH.TAP.SCREW	
31	SBST3006Z	TH.TAP.SCREW, X2	
32	PU21509B-11	CENTER UPPER STAY ASSY	
△ 33	PU49485-2	WIRE CLAMP, X2	
34	SBST3006Z	TH.TAP.SCREW, X4	
36	GBST3008Z	TH.TAP.SCREW, X2	
37	PU21590B-6	R.LOWER STAY ASSY	
38	PU48086	EDGE COVER	
39	SBST3006Z	TH.TAP.SCREW, X2	
△ 40	PGZ00126	POWER TRANSFORMER	
41	SBST3008Z	TH.TAP.SCREW, X4	
△ 44	QZF2115-002	FOOT, X4	
△ 45	SBST3010Z	TH.TAP.SCREW, X4	
47	DPSP3008Z	SCREW, X4	
49	GBST3008Z	TH.TAP.SCREW, X2	

#	REF NO.	PART NO.	PART NAME, DESCRIPTION

51	SBST3006Z	TH.TAP.SCREW, X2	
53	PU33706B-2	PRE/REC SHIELD ASSY	
57	SBST3006Z	TH.TAP.SCREW, X13	
59	GBST3008Z	TH.TAP.SCREW, X2	
60	PGD40100	STAY	
62	PGD30117A	Y SHIELD ASSY	
63	GBST3008Z	TH.TAP.SCREW, X2	
65	GBST3008Z	TH.TAP.SCREW, X3	
67	GBST3008Z	TH.TAP.SCREW	
△ 68	QMF51E2-4R0	FUSE(F002)	
△ 69	QMF51E2-3R15	FUSE(F003)	
△ 70	QMF51E2-R63	FUSE(F004)	
△ 71	QMF51E2-R80	FUSE(F005)	
△ 72	QMF51E2-R80	FUSE(F006)	
△ 73	QMF51E2-R80	FUSE(F007)	
△ 74	QMF51E2-2R0	FUSE(F008)	
△ 75	QMF51E2-R63	FUSE(F009)	
△ 76	QMF51E2-1R0	FUSE(F010)	
△ 77	QMF51E2-R40	FUSE(F011)	
78	PGD30156	SHIELD PLATE	
81	PGD40206	SW BRACKET	
82	SBST3006Z	TH.TAP.SCREW, X2	
83	LPSP2604Z	SCREW, X2	
85	PU49485	WIRE CLAMP, X2	

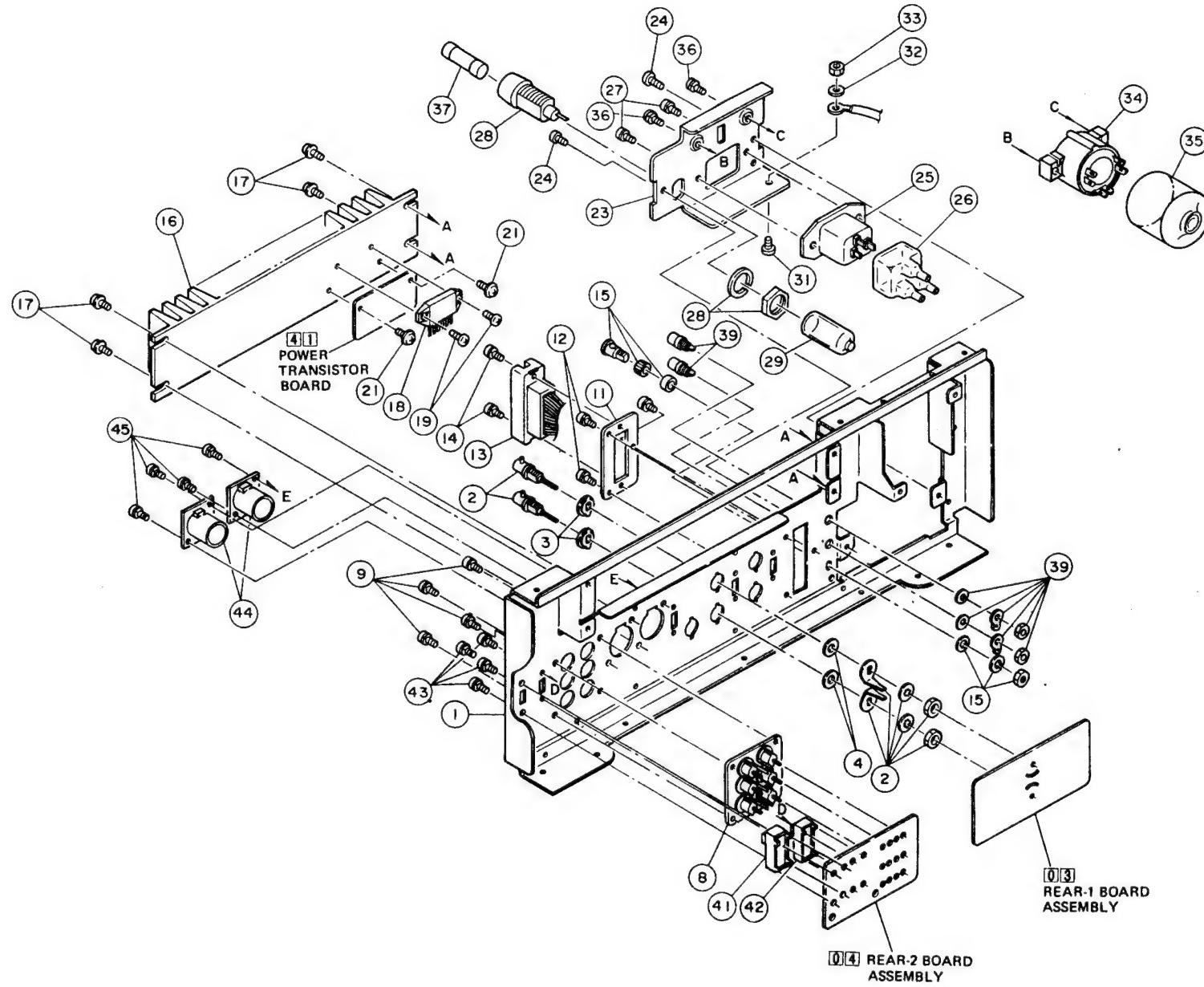


*△ REF NO. PART NO. PART NAME, DESCRIPTION

* MOUNTING BRACKET ASSEMBLY *

1	PGD10024-01-04	MOUNTING BRACKET
2	PGD30153	KNOB PLATE(A)
3	PGD30154	KNOB PLATE(B)
4	LPSP2606Z	SCREW, X2
5	PGD40021-2	OPE.KNOB(A)
6	PGD40021-3	OPE.KNOB(A)
7	PGD40021-4	OPE.KNOB(A)
8	PGD40022-2	OPE.KNOB(B)
9	PGD40022-3	OPE.KNOB(B), X2
10	PGD40022-4	OPE.KNOB(B)
11	PGD30004-3	COMP.SPRING, X10
12	SBST3006Z	TH.TAP.SCREW, X2
14	LPSP2606Z	SCREW, X7
16	LPSP2606Z	SCREW
18	PGZ00023-001	V RESISTOR, X2
19	PGZ00023-002	V RESISTOR
20	PGZ00023-003	V RESISTOR
21	PGZ00023-06	V RESISTOR, X2
22	PGZ00016	SLIDE SWITCH, X2
23	LPSP2604Z	SCREW, X6
24	PGD40118	TERMINAL BRACKET
25	PGZ00106	TERMINAL, X6
26	PGZ00107	TERMINAL, X2
28	SBST3006Z	TH.TAP.SCREW, X2
△ 29	PU49881	EDGE COVER
△ 30	PU53866-5-5	METER, X2
△ 31	PU53866-4	METER
△ 32	PGD40056	CUSHION, X3
△ 33	PGD40146	SHEET
34	PGZ00124-2	HOUR METER BASE
△ 35	QSP2111-011	PUSH SWITCH
△ 36	PU54681	SWITCH COVER
37	DPSP3006Z	SCREW, X2
38	PGZ00017	SLIDE SWITCH
39	PU50638	ROTARY SW
40	PU53866-LAMP	METER LAMP, X3

5.2.6 Rear bracket assembly

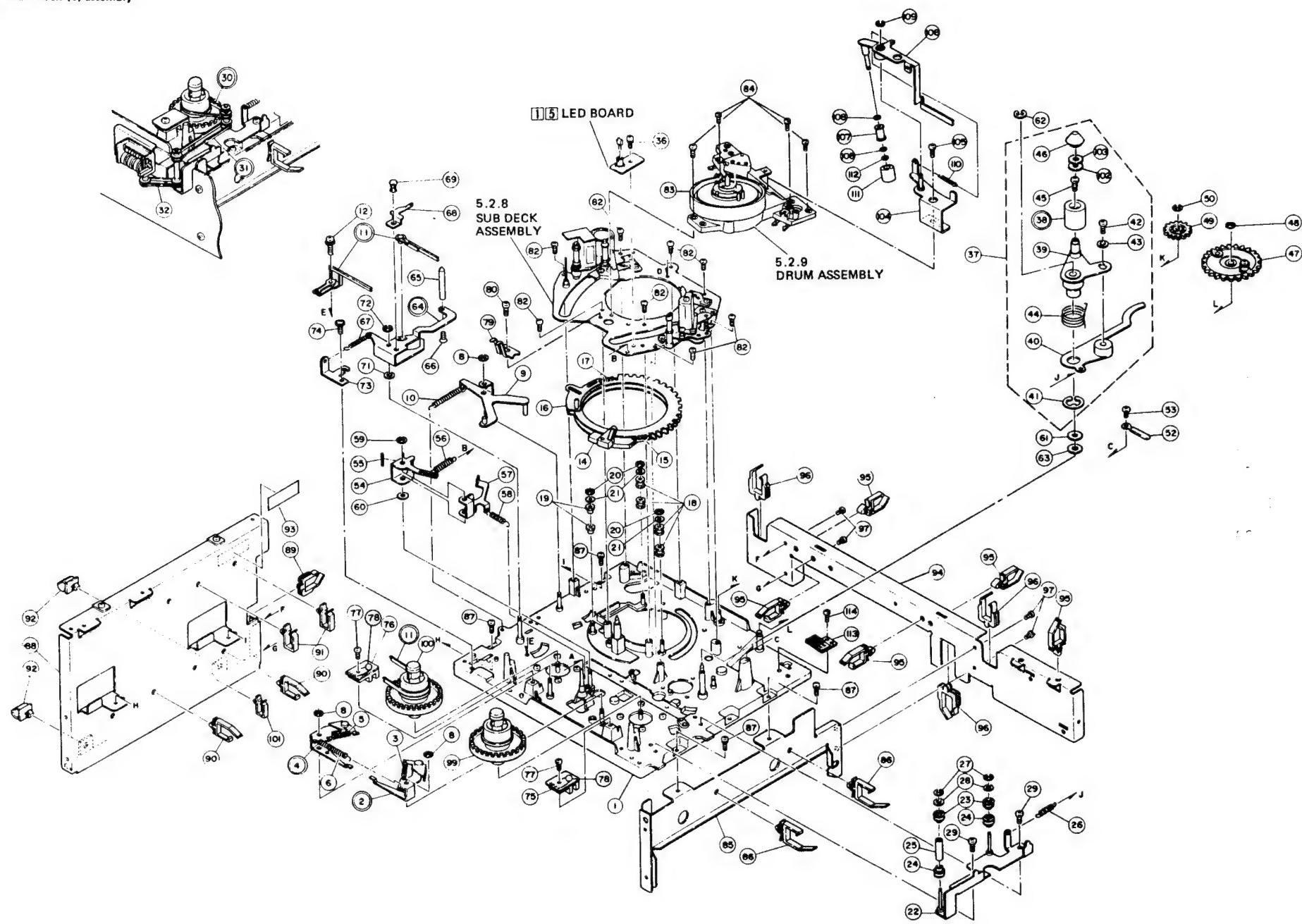


*△ REF NO. PART NO. PART NAME, DESCRIPTION

* REAR BRACKET ASSEMBLY *

1	PGD10025-1-4	REAR BRACKET
2	PU51213	BNC CONNECTOR, X2
3	PU48611	RING, X2
4	Q03093-439	WASHER, X2
8	PGZ00108	JACK ASSY
9	LPSP3006Z	SCREW, X4
11	PGD40121-2	PLATE
12	LPSP3006Z	SCREW, X3
13	PGD40262B	CONNECTOR ASSY
14	LPSP2610Z	SCREW, X2
15	PGZ00110	EARTH TERMINAL
△ 16	PGD30159	HEAT SINK
17	GBST3008Z	TH.TAP.SCREW, X4
△ 18	STK5730	IC
19	SDSP3012Z	SCREW, X2
21	GBST3008Z	TH.TAP.SCREW, X2
△ 23	PGD30202	POWER BRACKET
24	LPSP3008Z	SCREW, X2
△ 25	PGZ00818	AC CONNECTOR
△ 26	PU52931	CONNECTOR COVER
△ 27	LPSP3008Z	ASSY SCREW, X2
△ 28	QMG0301-003	FUSE HOLDER
△ 29	PU50316	FUSE COVER
△ 31	SDBP4008N	SCREW
32	WLS4000N	L.WASHER
△ 33	NNB4000N	NUT
△ 34	QSR0085-004	VOLTAGE SELECTOR
△ 35	PU54680	VOLTAGE SELECTOR COVER
△ 36	LPSP3008Z	ASSY SCREW, X2
△ 37	QMF51E2-1R6	FUSE(F001)
39	PGZ00134	RCA JACK ASS'Y, X2
41	PGZ00017	SLIDE SWITCH
42	PGZ00016	SLIDE SWITCH
43	LPSP2604Z	SCREW, X4
44	PU53563-6	XLR CONNECTOR, X2
45	SPBP2606R	SCREW, X4

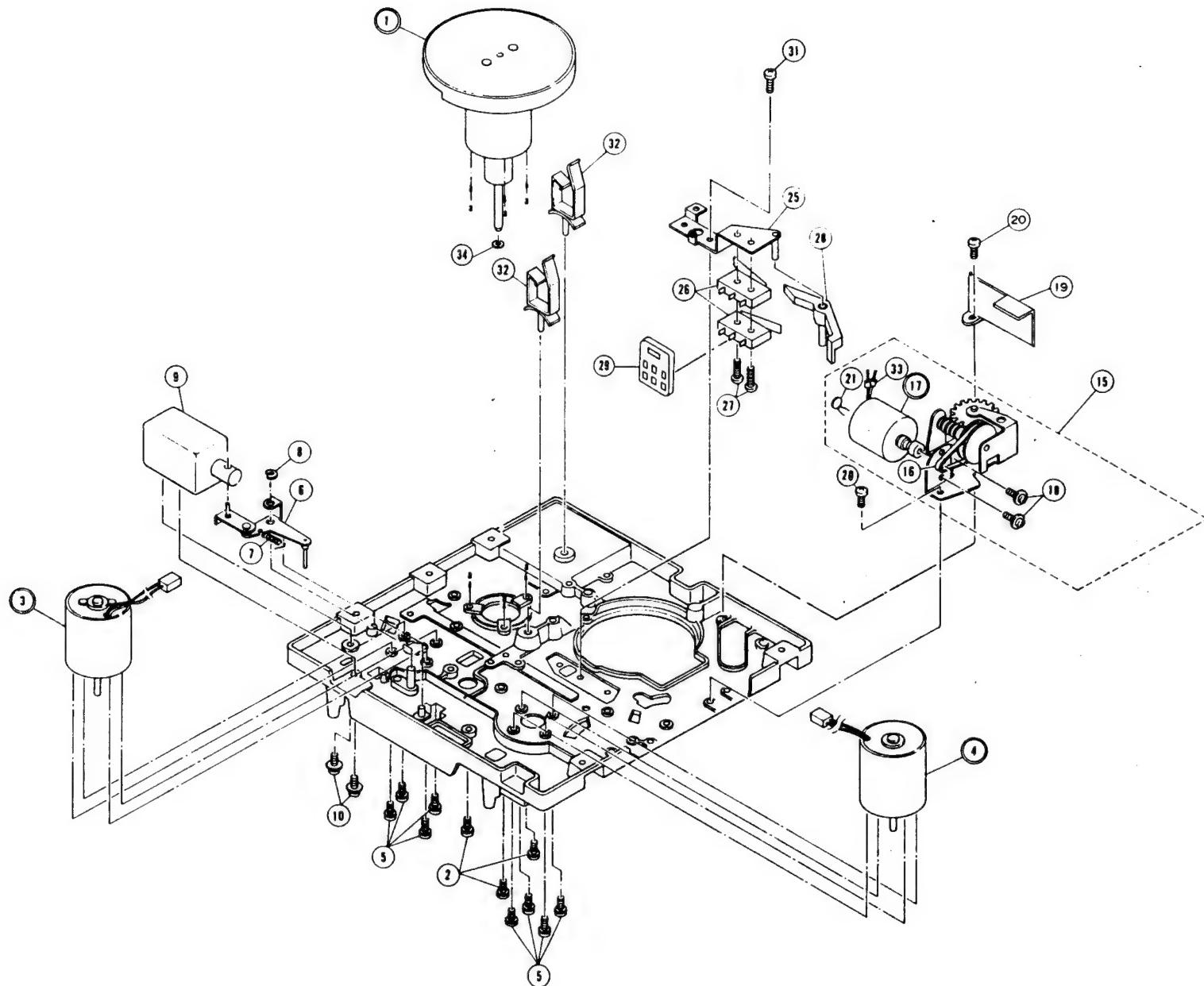
5.2.6 Main deck (1) assembly



#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION

* MAIN DECK ASSEMBLY(1) *							
1	PU21159C-07	MAIN DECK ASSY		54	PRD40096A	SUB BRAKE ASSY	
2	PU50535D	BRAKE ASSY		55	PRD40010	PAD	
3	PRD30024-2	SPRING		56	PGD30003-6	SPRING	
4	PU50535C	BRAKE ASSY		57	PRD40098A	RELEASE ARM ASY	
5	PUM30001-47	SPRING		58	PGD30003-7	SPRING	
6	PUM30001-29	SPRING		59	REE3000	"E"RING	
8	REE3000	"E"RING, X3		60	Q03093-818	WASHER	
9	PU50545A-5	CANCEL LEVER ASSY		61	Q03093-836	WASHER(T=0.25)	
10	PUM30001-32	SPRING		62	REE5000	E.RING	
11	PU51390A	TENSION BAND ASSY		63	Q03093-844	WASHER(T=0.13)	
12	DPSP3008Z	SCREW		64	PRD400858	TENSION ARM ASSY	
14	PU48838D	DRIVE RING ASSY(T.U.)		65	PU44852-2	TENSION POLE	
15	PU35005-81	SPRING		66	SSSP2605Z	SCREW	
16	PU48837B	DRIVE RING ASSY(SUP.)		67	PRD30024-36	TENSION SPRING	
17	PU35005-81	SPRING		68	PRD40091-01-04	E.P.STOPPER	
18	PU48711	PULLEY, X4		69	E48729-009	PLASTIC RIBET	
19	PU50758	PULLEY, X2		71	Q03093-830	WASHER	
20	REE3000	"E"RING, X3		72	REE1500	"E" RING	
21	Q03093-818	WASHER, X3		73	PRD40074-01-01	SPRING HOLDER	
22	PRD40075A	COUNTER HOLDER ASSY		74	NPSP3008Z	ASSY SCREW	
23	PRD40082	COUNTER PULLEY, X2		75	PU55701	PHOTO INTERRAPT(T.U.)	
24	PRD40082-2	COUNTER PULLEY, X2		76	PU55701	PHOTO INTERRAPT(SUP.)	
25	PRD40083	COUNTER PIPE		77	SBST3008Z	TH.TAP.SCREW, X2	
26	PUM30001-13	SPRING		78	QCF11HP-223	CAPACITOR, X2	
27	REE1500	"E" RING, X2		79	PRD40300	EARTH PLATE	
28	Q03093-838	WASHER, X2		80	SBST3008Z	TH.TAP.SCREW	
29	SBST3008Z	TH.TAP.SCREW, X2		82	SBST3008Z	TH.TAP.SCREW, X8	
30	PRD40084-1	COUNTER BELT		84	LPSP3010Z	SCREW, X4	
31	PRD40084-2	COUNTER BELT		85	PGD20014A	C.L-STAY ASS'Y	
32	PRD40084-3	COUNTER BELT		△ 86	PU54969	WIRE CLAMP, X2	
36	LPSP3004Z	SCREW		87	LPSP3008Z	ASSY SCREW, X4	
37	PRD40060A-05	PINCH ROLLER ASSY		88	PGD20015A-2	L.S.BKT ASS'Y	
38	PQ40137A	PINCH ROLLER ASSY		89	PU49881	EDGE COVER	
39	PRD40062	PINCH ROLLER ARM ASSY		△ 90	PU54969-2	WIRE CLAMP, X2	
40	PRD40066A-01	P.R.PRESSUR ARM ASSY		91	PU48016	MINI CLAMP, X2	
41	REE8000	E.WASHER		△ 92	PU47876	PWB HOLDER, X2	
42	DPSP3006Z	SCREW		93	PU42091	NO.PLATE	
43	PRD40061	COLLAR		94	PGD20016A-3	C.BKT (A) ASS'Y	
44	PRD40069	COIL SPRING		△ 95	PU54969-2	WIRE CLAMP, X5	
45	LPSP2604Z	SCREW		96	PU49881	EDGE COVER, X3	
46	PRD40104	P.ROLLER CAP		97	SBST3006Z	TH.TAP.SCREW, X4	
47	PRD40070B	P.ARM D.GEAR ASSY		99	PGZ00896A	REEL DISK ASSY(T.U.)	
48	REE3000	"E"RING		100	PGZ00897A	REEL DISK ASSY(SUP.)	
49	PRD40073	IDLE GEAR		101	PU48016-2	MINI CLAMP	
50	REE2500	"E" RING		102	Q03093-816	WASHER(T=0.5)	
△ 52	PU49485	WIRE CLAMP		103	Q03093-841	WASHER(T=0.25)	
53	SBST3006Z	TH.TAP.SCREW		104	PRD40511A-01	BRACKET ASSY	
				105	DPSP3006Z	SCREW	
				106	PRD40505A-02	CLEANER ARM ASSY	
				107	PRD40509	CLEANER ARM ASSY	
				108	Q03093-829	WASHER, X2	
				109	REE2500	"E" RING	
				110	PRD30024-8	SPRING	
				111	PRD40510-01-02	CLEANER	
				112	PUM30017	SLIT WASHER	
				113	PU56637B	DEW SENSOR ASSY	
				114	SDST2606Z	TAPPING SCREW	

5.2.7 Main deck (2) assembly

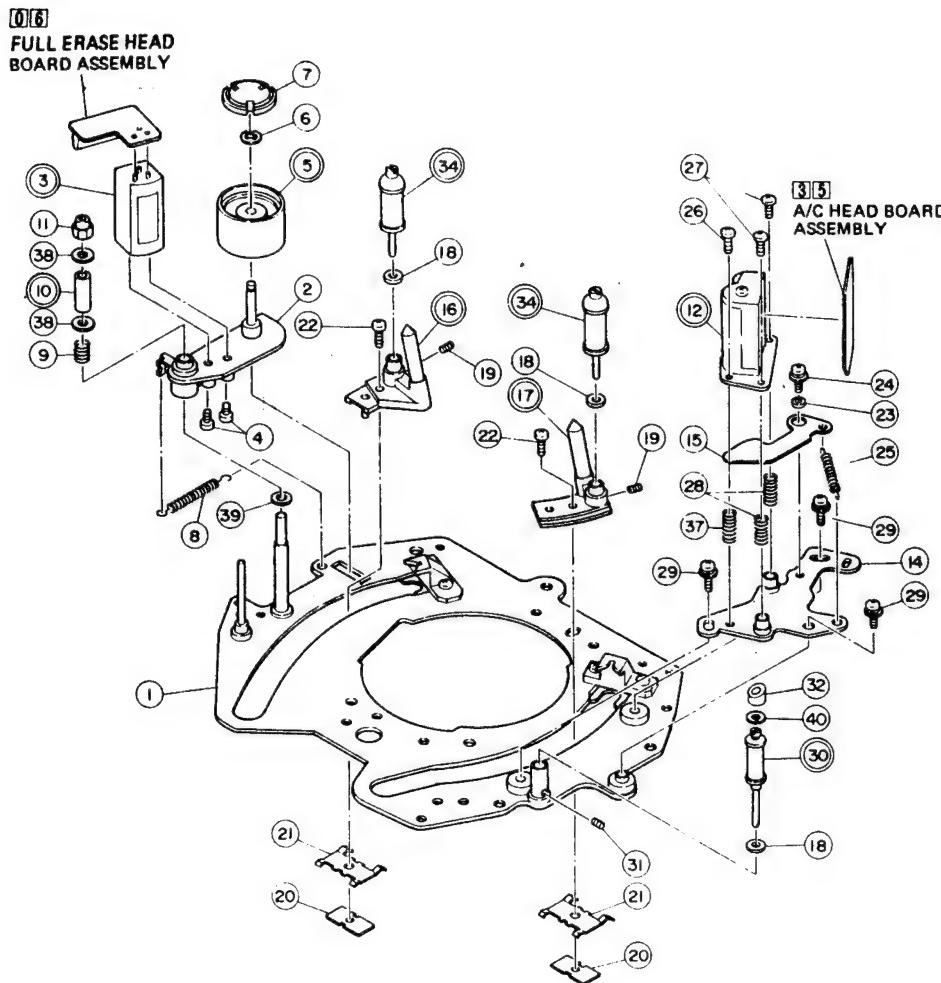


REF NO.	PART NO.	PART NAME, DESCRIPTION

*	MAIN DECK ASSEMBLY(2)	*

△ 1	PGZ00877	CAPSTAN MOTOR
2	LPSP3008Z	SCREW, X3
△ 3	PGZ00895	REEL MOTOR(T.U.)
△ 4	PGZ00895	REEL MOTOR(SUP.)
5	LPSP3006Z	SCREW, X8
6	PU50538A	CONNECT LEVER ASSY
7	PUM30001-6	SPRING
8	REE3000	"E"RING
△ 9	PGZ00092	SOLENOID
10	DPSP3008Z	SCREW, X2
15	PGZ00032A-1	LOADING DRIVE ASSY
16	PU50350	BELT
△ 17	PU52745A	DC MOTOR ASSY
18	LPSP2604Z	SCREW, X2
19	PGD40135	GEAR COVER
20	SBST3008Z	TH.TAP.SCREW, X2
△ 21	QCF11HP-473	CAPACITOR
25	PU48952A-3	SW.BRACKET ASSY
26	QSM1S11-211	MICRO SWITCH, X2
27	SPBP2316N	SCREW, X2
28	PU48955	SW.LEVER
29	PGE40069-1-1	LD/UNLD SW PWB
31	SBST3006Z	TH.TAP.SCREW
△ 32	PU54969-2	WIRE CLAMP, X2
△ 33	PU45811	FERRITE BEADS, X2
34	PRD40524	S.WASHER

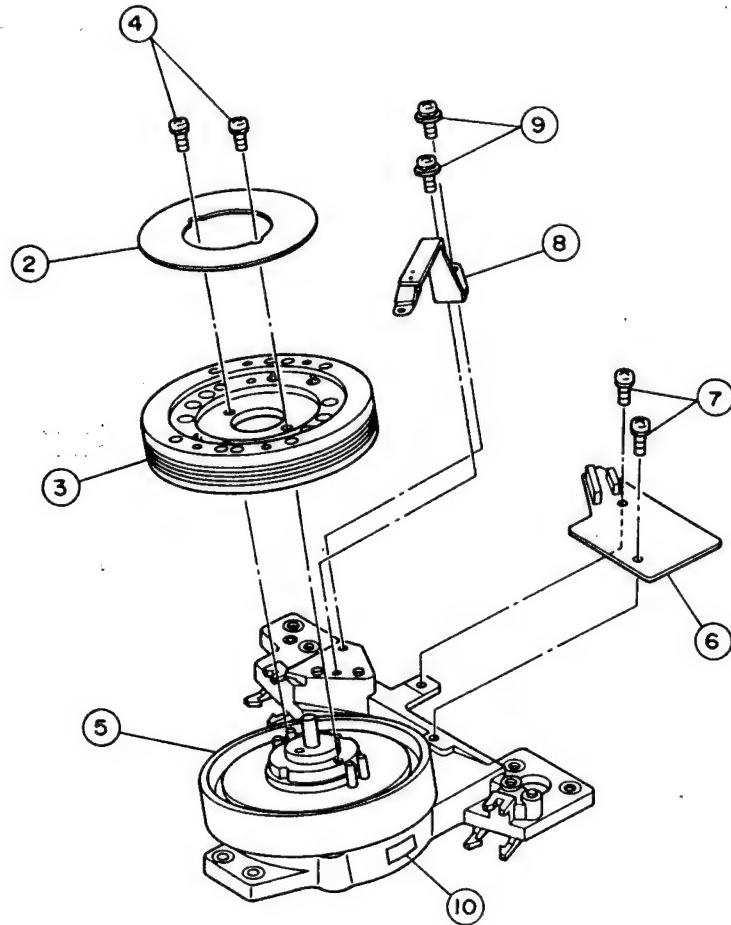
5.2.8 Sub deck assembly



*Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION

* SUB DECK ASSEMBLY *			
1	PRD30118A-01	SUB DECK SUB ASSY	
2	PRD40087B	ERASE HEAD ARM SUB ASSY	
3	PU54397	FULL ERASE HEAD	
4	SSSP2005Z	SCREW, X2	
5	PU51203A	ROLLER ASSY	
6	REE1500	"E" RING	
7	PU51204	THRUST CAP	
8	PUM30001-13	SPRING	
9	PU30080-69	SPRING	
10	PU53826	GUIDE POLE	
11	PU49276	NYLON NUT	
12	PGZ00271	A/C HEAD ASSY	
14	PRD40019A	HEAD BASE SUB ASSY	
15	PRD40021	GUIDE PLATE	
16	PRD40522A	POLE BASE ASSY(SUP.)	
17	PRD40523A-01	POLE BASE ASSY(T.U.)	
18	PU48806-3	RUBBER TIRE, X3	
19	YFS3002.5FS	SCREW, X2	
20	PU51638	PLATE, X2	
21	PU51299	SPRING PLATE, X2	
22	SPSP2606Z	SCREW, X2	
23	PUM30005-12	COLLER	
24	DPSP3006Z	SCREW	
25	PUM30001-19	SPRING	
26	SPSP2610Z	SCREW	
27	SPSP2608Z	SCREW, X2	
28	PU30080-49	SPRING, X2	
29	DPSP3006Z	SCREW, X3	
30	PRD40027B	G.ROLLER ASSY(T.U.)	
31	YFS3002.5FS	SCREW	
32	PRD40030	CAP	
34	PU48748D	G.ROLLER ASSY, X2	
37	PGD30004-5	SRPING	
38	PU51294	GUIDE FRANGE, X2	
39	Q03093-819	WASHER	
40	Q03093-817	SPACER	

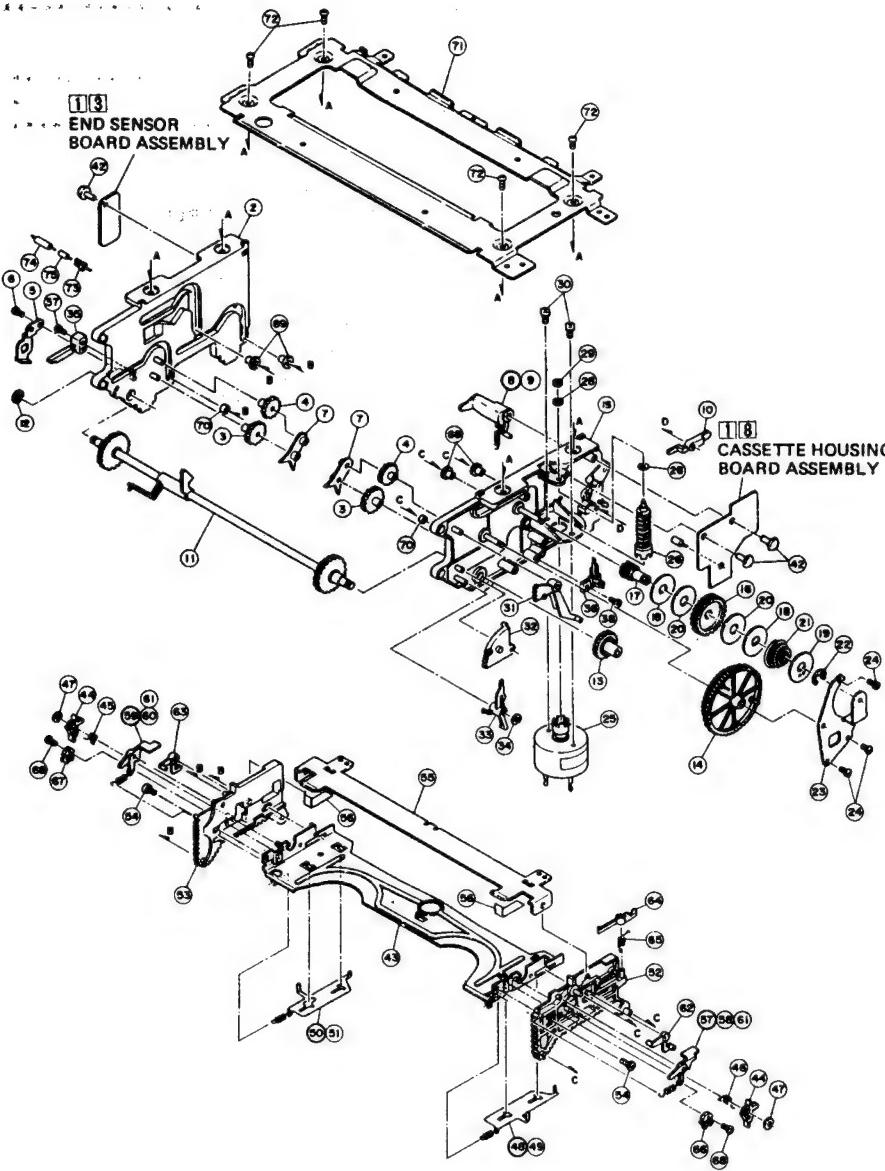
5.2.9 Drum assembly



#	REF NO.	PART NO.	PART NAME, DESCRIPTION

* DRUM ASSEMBLY *			
1	PDV2154A	DRUM ASSY	
2	PDM3193	BOARD (UPPER DRUM)	
3	PDM2104B	UPPER DRUM ASSY	
4	PDM4001A	DRUM SCREW ASSY, X2	
5	PDM2105B-2	LOWER DRUM MOTOR ASSY	
6	PDM4167A	C.PWB ASS'Y	
7	LPSP2606Z	SCREW , X2	
8	PDM4162A	BRUSH ASSY	
9	DPSP3006Z	SCREW, X2	
10	PDM4067	PART NO. LABEL	

5.2.10 Cassette housing assembly



#	REF NO.	PART NO.	PART NAME, DESCRIPTION

* CASSETTE HOUSING ASSEMBLY *			

2	PRD30125A	G.STAY(L) ASS'Y	
3	PQ40059	GEAR-1, X2	
4	PRD40270	GEAR-2, X2	
5	PRD40532	SW COVER	
6	SBSE2608Z	SCREW	
7	PQ40061	DOUBLE CAP, X2	
8	PQ40102A-1	DOOR GUIDE ASSY	
9	PUM30001-111	SPRING	
10	PQ40063	GUIDE LEVER	
11	PRD40119A-1	CONNECT GEAR ASSY	
12	PUM30017-11	SLIT WASHER	
13	PRD40118	CAM GEAR(2)	
14	PRD30124	MAIN GEAR	
15	PRD30126A-02	G.STAY(R) ASS'Y	
16	PRD40527	WORM WHEEL	
17	PRD40529A	CLUTCH GEAR ASSY	
18	PRD40534	CLUTCH DISK, X2	
19	PRD40535	SPRI.HOLD PLATE	
20	PRD40537	PAD, X2	
21	PRD40538-01-03	COMPRESSION SPRING	
22	REE6000	E WASHER	
23	PRD40533	GEAR BRACKET	
24	SBSE2608Z	SCREW, X3	
△ 25	PQ40090A	MOTOR ASSY	
26	PRD40291	WORM ASSY	
28	Q03093-838	WASHER, X2	
29	PUM30017	SLIT WASHER	
30	SPSP2604Z	SCREW, X2	
31	PQ40074	U.DOOR OPENER	
32	PQ40075-1-5	L.DOOR OPENER	
33	PQ40076-2	HOLD LEVER	
34	REE2500	E.RING	
35	PU51259-3	LEAF SWITCH	
36	PU55377-2	END SW	
37	SPSP2010Z	SCREW	
38	SBSE2608Z	SCREW	
42	PQ48973-3	STOPPER, X3	
43	PRD30123A	CASSETTE HOLDER ASSY	
44	PRD30122-01-01	SW LEVER, X2	
45	PRD40539	TORSION SPRING(L)	
46	PRD40540	TORSION SPRING(R)	

SECTION 6 ELECTRICAL PARTS LIST

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	47	PUM30017	SLIT WASHER, X2
	48	PQ40106B-1	S.PLATE(R) ASSY
	49	PUM30001-210	SPRING
	50	PQ40107B-2	S.PLATE(L) ASSY
	51	PUM30001-210	SPRING
	52	PRD10052	BRACKET(R)
	53	PRD10052-02	BRACKET(L)
	54	SPSP2003Z	SCREW, X2
	55	PQ30032-1-3	REINFORCEMENT
	56	PGD40204	TEPHRON SHEET, X2
	57	PQ40108B-3	LOCK LEVER(R) ASSY
	58	PUM30001-110	SPRING
	59	PQ40109B-3	LOCK LEVER(L) ASSY
	60	PUM30001-110	SPRING
	61	PQM30019-10	PAD, X2
	62	PQ40081A	SW.LEVER(R) ASSY
	63	PQ40081B	SW.LEVER(L) ASSY
	64	PQ40083-1-5	LID OPENER
	65	PQ40084-1-2	TORSION SPRING
	66	PGZ00503	INSERT SW(R)
	67	PGZ00502	INSERT SW(L)
	68	SPSK1705M	SCREW, X2
	69	PQ40086	ROLLER, X4
	70	PQ40087-2	MINI ROLLER, X2
	71	PRD20034	ROOF PLATE
	72	SBSE2608Z	SCREW, X4
△	73	PQ40299	WIRE CLAMP
△	74	QXT329H-035	TUBE
	75	PRD40101	WIRE GUARD

SAFETY PRECAUTION

Parts identified by the **△** symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS—All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μF , unless otherwise indicated.

pF	: $\mu\mu\text{F}$ (Pico farad)
C Cap	: Ceramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metallized Mylar Capacitor
MP Cap	: Metallized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

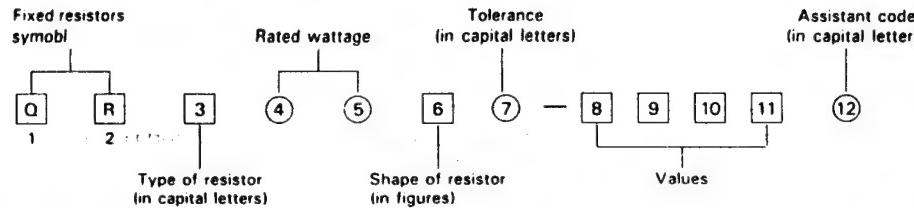
NOTES:

- [2 digits] indicates circuit board symbol number.
- "X" indicates quantity per set.

6.1 STANDARD PART NUMBER CODING

6.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.



Type of resistor (third digit)	Rated wattage (fourth and fifth digits)	Tolerance (seventh digit)	Assistant code (twelfth digit)
C Composition resistors	A0 1/10 W	F $\pm 1\%$	A Small type
D Carbon film resistors	18 1/8 W	G $\pm 2\%$	B Small type
F Inflammable resistors	16 1/6 W	J $\pm 5\%$	S Small type
G Oxide metal film resistors	14 1/4 W	K $\pm 10\%$	Y Lead taping
H Fusible resistors	12 1/2 W	M $\pm 20\%$	Z Lead taping
M Metal plate resistors	01 1 W		
S Metal glazed resistors	02 2 W		
V Precision metal film resistors	03 3 W		
W Wire wound resistors	04 4 W		
X Metal film resistors	05 5 W		
Z Special resistors	06 6 W	R47	0.47 Ω
	07 7 W	4R7	4.7 Ω
	08 8 W	470	47×10^0
	10 10 W	471	47×10^1
	15 15 W	472	47×10^2
	A6 16 W	473	47×10^3
	20 20 W	474	47×10^4
	30 30 W	475	47×10^5
GRV resistance shown by four digits:			
4640			
4641			
4642			
464×10^0			
464×10^1			
464×10^2			
464×10^3			

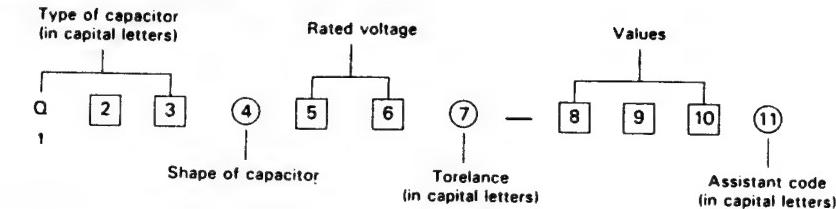
Shape of resistor (sixth digit)

Note: indicates flame retardant resistor.

Shape of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type							
9			Lug (C) type							

6.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



Ceramic capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1, 4	3			8.A
QCS	Temperature compensation	1	3	4	5	8.A
QCT	Temperature compensation					8.A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1, 4	3	6	7	8.A
QCZ	Special type					Special coding
QCB	Ceramic			8	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4, 8, A	9, B	6, C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEFL	Chip tantalum					8 (chip type)
QEGL	Low impedance		4			
QEKL	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4, A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4, A	5, B	6, C	
QER	Miniature type		4	5	6	
QET	Small type	2	4, A	5, B	6, C	7
QEUL	Small type		4	5	6	
QEVL	Small type		4		6	7
QEWF	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)					
Symbol	Characteristics	Tubular	Normal		Flame retardant		
			Mono-direction	Kink lead	Mono-direction	Kink lead	
QFA	Metalized polypropylene				7		
QFE	Metalized mylar				5		
QFF	Film mica		4				
QFG	Polypropylene film		4	8			
QFH	Metalized mylar	2	4	3	5,7	6	
QFJ	Mylar (special)			4			
QFK	Metalized mylar (small)				5		
QFM	Mylar	2	4	3,7	5	6	
QFN	Mylar (small)			4	3		
QFP	Polypropylene			4	3,8		
QFS.	Polystyrole	2	4	3			
QFV	Thin film			4	8		
QFZ	Special type		Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
Fifth digit													
0						3.15	4.0		6.3				
1	10		16	20	28		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000			5000						

Tolerance (seventh digit)

A	+ 100 %	M	± 20 %
F	± 1 %	N	± 30 %
G	± 2 %	P	+ 100 %
H	+ 50 %	R	+ 30 %
J	± 5 %	X	+ 40 %
K	± 10 %	Z	+ 80 %
			- 20 %

Values (eighth – tenth digits)

Example : Values are in picofarads

101	.....	10 × 10 ¹ pF	.....	100 pF
102	.....	10 × 10 ² pF	.....	1,000 pF (0.001 μF)
103	.....	10 × 10 ³ pF	.....	10,000 pF (0.01 μF)
104	.....	10 × 10 ⁴ pF	.....	100,000 pF (0.1 μF)
105	.....	10 × 10 ⁵ pF	.....	1 μF
5R0	.....			5.0 pF

Assistant code (eleventh digit)

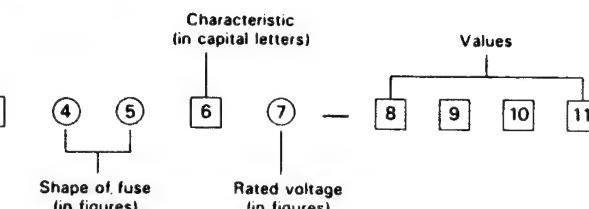
G Small size

Z Lead taping

Y Lead taping

6.1.3 Fuse coding

Standard fuse part numbers are as follows.



Shape of fuse
(fourth and fifth digits)

51	ø5.2 × 20 mm
60	ø6.4 × 30 mm
61	ø6.35 × 31.8 mm
63	ø6.4 × 30 mm with lead wires
66	ø6.35 × 31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V 1.25 – 6.3 A : AC125 V
00	Special type

Values
(eighth-tenth or eleventh digits)
example:

R63	.....	0.63 A
1R0	.....	1.0 A
2R5	.....	2.5 A
100	.....	10 A
R315	.....	0.315 A
1R25	.....	1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
	160 %	Within 1 hr.	
S	200 %	Within 1 hr.	Anti-rush type
	700 % – 2000 %	Within 0.01 sec.	
	135 %	Within 1 hr.	
U	200 %	Within 2 min.	Anti-rush type (for UL)
	800 % – 2000 %	Within 0.01 sec.	

6.2 ELECTRICAL PARTS LIST ASSEMBLY

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION	#A	REF NO.	PART NO.	PART NAME, DESCRIPTION	#A	REF NO.	PART NO.	PART NAME, DESCRIPTION	#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
				D43	0490	DIODE		R62	QRD167J-332	RESISTOR		R135	QRD167J-334	RESISTOR	
				D44	0490	DIODE		R63	QRD167J-223	RESISTOR		R136	QRD167J-104	RESISTOR	
				D45	RD2_0EB	ZENER DIODE		R64	QRD167J-223	RESISTOR		R137	QRD167J-104	RESISTOR	
					OR RD2_0EC	ZENER DIODE		R65	QRD161J-103	RESISTOR		R138	QRD167J-332	RESISTOR	
				D46	RD2_0EB	ZENER DIODE		R66	QRD161J-103	RESISTOR		R139	QRD167J-332	RESISTOR	
					OR RD2_0EC	ZENER DIODE		R67	QRG129J-470	RESISTOR		R140	QRD167J-104	RESISTOR	
				R1	QVZ3506-152	V RESISTOR		R68	QRG129J-470	RESISTOR		R141	QRD167J-104	RESISTOR	
				R2	QVZ3506-152	V RESISTOR		R69	QRD167J-124	RESISTOR		R401	QVZ3506-682	V RESISTOR	
				R3	QVZ3506-103	V RESISTOR		R70	QRD167J-124	RESISTOR		R402	QVZ3504-682	V RESISTOR	
				R4	QVZ3506-103	V RESISTOR		R71	QRD167J-123	RESISTOR		R403	QRD167J-561	RESISTOR	
				R5	QVZ3506-222	V RESISTOR		R72	QRD167J-123	RESISTOR		R404	QRD167J-561	RESISTOR	
				R6	QVZ3506-222	V RESISTOR		R73	QRD167J-822	RESISTOR		C3	QCS11HJ-681	CAPACITOR	
				R7	QVZ3507-101	V RESISTOR		R74	QRD167J-822	RESISTOR		C4	QCS11HJ-681	CAPACITOR	
				R8	QVZ3507-101	V RESISTOR		R75	QRD167J-563	RESISTOR		C5	QEB41CM-106	LL CAP	
				R9	QVZ3507-683	V RESISTOR		R76	QRD167J-822	RESISTOR		C6	QEB41CM-106	LL CAP	
				R10	QVZ3507-683	V RESISTOR		R77	QRD167J-223	RESISTOR		C7	QEB41EM-475	E CAPACITOR	
				R11	QRD167J-822	RESISTOR		R78	QRD167J-223	RESISTOR		C8	QEB41EM-475	E CAPACITOR	
				R12	QRD167J-822	RESISTOR		R79	QRZ0054-150	FUSIBLE RESISTOR		C9	QER41CM-226	E CAPACITOR	
				R13	QRD167J-100	RESISTOR		R80	QRZ0054-150	FUSIBLE RESISTOR		C10	QER41CM-226	E CAPACITOR	
				R14	QRD167J-100	RESISTOR		R81	QRV145F-3301	CMF RESISTOR		C11	QEB41EM-475	E CAPACITOR	
				R15	QRD167J-183	RESISTOR		R82	QRV145F-3301	CMF RESISTOR		C12	QEB41EM-475	E CAPACITOR	
				R16	QRD167J-183	RESISTOR		R83	QRD167J-104	RESISTOR		C13	QER41CM-226	E CAPACITOR	
				R17	QRD167J-153	RESISTOR		R84	QRD167J-104	RESISTOR		C14	QER41CM-226	E CAPACITOR	
				R18	QRD167J-153	RESISTOR		R85	QRD167J-103	RESISTOR		C15	QEU41CM-337	E CAPACITOR	
				R19	QRD167J-122	RESISTOR		R86	QRD167J-103	RESISTOR		C16	QEU41CM-337	E CAPACITOR	
				R20	QRD167J-122	RESISTOR		R87	QRD167J-181	RESISTOR		C17	QEB41CM-106	LL CAP	
				R21	QRD167J-472	RESISTOR		R88	QRD167J-181	RESISTOR		C18	QEB41CM-106	LL CAP	
				R22	QRD167J-472	RESISTOR		R89	QRD167J-473	RESISTOR		C19	QER41CM-476	E CAPACITOR	
				R23	QRD167J-474	RESISTOR		R90	QRD167J-473	RESISTOR		C20	QER41CM-476	E CAPACITOR	
				R24	QRD167J-474	RESISTOR		R91	QRD167J-562	RESISTOR		C21	QFV41HJ-823	TF CAPACITOR	
				R25	QRD167J-473	RESISTOR		R92	QRD167J-562	RESISTOR		C22	QFV41HJ-823	TF CAPACITOR	
				R26	QRD167J-473	RESISTOR		R93	QRD167J-273	RESISTOR		C23	QER41CM-106	E CAPACITOR	
				R27	QRD167J-393	RESISTOR		R94	QRD167J-273	RESISTOR		C24	QER41CM-106	E CAPACITOR	
				R28	QRD167J-393	RESISTOR		R95	QRD167J-102	RESISTOR		C25	QER41CM-106	E CAPACITOR	
				R29	QRD167J-222	RESISTOR		R96	QRD167J-154	RESISTOR		C26	QER41CM-106	E CAPACITOR	
				R30	QRD167J-222	RESISTOR		R97	QRD167J-222	RESISTOR		C29	QER41HM-335	E CAPACITOR	
				R31	QRD167J-221	RESISTOR		R98	QRD167J-222	RESISTOR		C30	QER41HM-335	E CAPACITOR	
				R32	QRD167J-221	RESISTOR		R100	QRD167J-274	RESISTOR		C31	QER41CM-226	E CAPACITOR	
				R33	QRD167J-473	RESISTOR		R101	QRD167J-154	RESISTOR		C32	QER41CM-226	E CAPACITOR	
				R34	QRD167J-473	RESISTOR		R102	QRD167J-154	RESISTOR		C33	QFV41HJ-533M	TF CAPACITOR	
				R35	QRD167J-393	RESISTOR		R103	QRD167J-562	RESISTOR		C34	QFV41HJ-533M	TF CAPACITOR	
				R36	QRD167J-393	RESISTOR		R104	QRD167J-122	RESISTOR		C35	QER41CM-106	E CAPACITOR	
				R37	QRD167J-222	RESISTOR		R105	QRD167J-151	RESISTOR		C36	QER41CM-106	E CAPACITOR	
				R38	QRD167J-222	RESISTOR		R106	QRD167J-821	RESISTOR		C37	QEU41CM-107	E CAPACITOR	
				R39	QRD167J-221	RESISTOR		R107	QRD167J-681	RESISTOR		C38	QEU41CM-107	E CAPACITOR	
				R40	QRD167J-221	RESISTOR		R108	QRD167J-562	RESISTOR		C39	QER40JM-107	E CAPACITOR	
				R41	QRD167J-183	RESISTOR		R109	QRD161J-681	RESISTOR		C40	QER40JM-107	E CAPACITOR	
				R42	QRD167J-183	RESISTOR		R110	QRD167J-471	RESISTOR		C41	QER41CM-106	E CAPACITOR	
				R43	QRG129J-471	RESISTOR		R113	QRD167J-822	RESISTOR		C42	QER41CM-106	E CAPACITOR	
				R44	QRG129J-471	RESISTOR		R114	QRD167J-821	RESISTOR		C43	QER41CM-106	E CAPACITOR	
				R45	QRD167J-080	RESISTOR		R115	QRD167J-823	RESISTOR		C44	QER41CM-106	E CAPACITOR	
				R46	QRD167J-562	RESISTOR		R116	QRD167J-682	RESISTOR		C45	QCS11HJ-101	CAPACITOR	
				R47	QRD167J-102	RESISTOR		R117	QRD167J-183	RESISTOR		C46	QCS11HJ-101	CAPACITOR	
				R48	QRD167J-562	RESISTOR		R118	QRD167J-223	RESISTOR		C47	QER41HM-335	E CAPACITOR	
				R49	QRD167J-581	RESISTOR		R119	QRD167J-822	RESISTOR		C48	QER41HM-335	E CAPACITOR	
				R50	QRD167J-561	RESISTOR		R120	QRD167J-821	RESISTOR		C49	QER41HM-105	E CAPACITOR	
				R51	QRD167J-393	RESISTOR		R121	QRD167J-103	RESISTOR		C50	QER41HM-105	E CAPACITOR	
				R52	QRD167J-393	RESISTOR		R122	QRD167J-333	RESISTOR		C51	QEP41HM-335	E CAPACITOR	
				R53	QRD167J-122	RESISTOR		R123	QRD167J-683	RESISTOR		C52	QEP41HM-335	E CAPACITOR	
				R54	QRD167J-102	RESISTOR		R124	QRD167J-103	RESISTOR		C53	QER41HM-335	E CAPACITOR	
				R55	QRD167J-102	RESISTOR		R125	QRD167J-103	RESISTOR		C54	QER41HM-335	E CAPACITOR	
				R56	QRD167J-102	RESISTOR		R127	QRD167J-472	RESISTOR		C55	QER41HM-335	E CAPACITOR	
				R57	QRD167J-102	RESISTOR		R128	QRD161J-103	RESISTOR		C56	QER41HM-335	E CAPACITOR	
				R58	QRD167J-102	RESISTOR		R132	QRD167J-682	RESISTOR		C57	QER41HM-335	E CAPACITOR	
				R59	QRD167J-103	RESISTOR		R133	QRD167J-682	RESISTOR		C58	QER41HM-335	E CAPACITOR	
				R60	QRD167J-103	RESISTOR		R134	QRD167J-334	RESISTOR		C59	QER41HM-336	E CAPACITOR	
				R61	QRD167J-332	RESISTOR									

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION	#A	REF NO.	PART NO.	PART NAME, DESCRIPTION	#A	REF NO.	PART NO.	PART NAME, DESCRIPTION	#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
C60	QER41CM-336	E CAPACITOR	L1 PGZ00121-472 PEAKING COIL	Q10	2SC2647C	TRANSISTOR	R9 QRD161J-125 RESISTOR								
C61	QFN41CM-227	E CAPACITOR	L2 PGZ00121-472 PEAKING COIL	Q11	2SC2647C	TRANSISTOR	R10 QRD161J-125 RESISTOR								
C62	QER41CM-227	E CAPACITOR	▲ L3 PU30284-51R CHOKE COIL	Q12	2SC2647C	TRANSISTOR	R11 QRD161J-681 RESISTOR								
C63	QER41CM-226	E CAPACITOR	L7 PU48530-391J PEAKING COIL	Q15	2SD973R	TRANSISTOR	R12 QRD161J-102 RESISTOR								
C64	QER41CM-226	E CAPACITOR	L8 PU48530-391J PEAKING COIL	Q16	2SD973R	TRANSISTOR	R13 QRD161J-473 RESISTOR								
C65	QFP42AF-273M	PP CAPACITOR	LPF1 PU51764 LOW PASS FILTER	Q17	2SD973R	TRANSISTOR	R14 QRD161J-272 RESISTOR								
	QFP42AF-273	PP CAPACITOR	LPF2 PU51764 LOW PASS FILTER	Q18	2SD973R	TRANSISTOR	R15 QRD161J-153 RESISTOR								
C66	QFP42AF-273M	PP CAPACITOR	SCW1 GBST3006Z TH.TAP.SCREW, X4	Q19	DTA114YF	TRANSISTOR	R16 QRD161J-471 RESISTOR								
	QFP42AF-273	PP CAPACITOR	SLD1 PU33643 SHIELD CASE	Q20	DTA114YF	TRANSISTOR	R17 QRD161J-224 RESISTOR								
C67	QER41EM-475	E CAPACITOR	SLD2 PGD40329-02 INSULATOR	Q21	DTA114EF	TRANSISTOR	R18 QRD161J-103 RESISTOR								
C68	QER41EM-475	E CAPACITOR	TP1 PU5008 TEST-PIN(TP1-27)	Q22	DTA124EF	TRANSISTOR	R19 QRD161J-681 RESISTOR								
C69	QFP42AF-562M	PP CAPACITOR	CN1 PU43351-2Y CAP HOUSING	Q23	DTC124EF	TRANSISTOR	R20 QRD161J-473 RESISTOR								
C70	QFP42AF-562M	PP CAPACITOR	CN2 PU43351-2 CAP HOUSING	Q24	2SB662R,S	TRANSISTOR	R21 QRD161J-152 RESISTOR								
	QFP31HF-562	PP CAPACITOR	CN3 PU43351-3 CAP HOUSING(CH3,6,7)	Q25	2SB793R	TRANSISTOR	R22 QRD161J-223 RESISTOR								
C71	QFN61HJ-122	M CAPACITOR	CN4 PU43351-2R CAP HOUSING	Q26	2SD638R,S	TRANSISTOR	R23 QRD161J-561 RESISTOR								
C72	QFN61HJ-122	M CAPACITOR	CNS PU43351-4 CAP HOUSING(CH5,9)	Q27	DTA114EF	TRANSISTOR	R24 QRD161J-821 RESISTOR								
C73	QFP42AF-472M	P P CAPA	CN8 PU43351-4Y CAP HOUSING	Q28	2SD973AR	TRANSISTOR	R25 QRD161J-102 RESISTOR								
C74	QFP42AF-472M	P P CAPA	CN10 PU43351-3Y CAP HOUSING	Q29	DTA124EF	TRANSISTOR	R26 QRD161J-102 RESISTOR								
	QFP31HF-472	P P CAPA	CN11 PU43351-4R CAP HOUSING	Q30	DTC124EF	TRANSISTOR	R27 QRD161J-102 RESISTOR								
C75	QFN41HJ-122	M CAPACITOR	CN12 PU43351-4R CAP HOUSING	CN41 PU43351-3Y CAP HOUSING	Q31	DTC124EF	TRANSISTOR	R28 QRD161J-102 RESISTOR							
C76	QFN41HJ-122	M CAPACITOR	CN42 PU43351-3R CAP HOUSING	CN44 PU43351-2 CAP HOUSING	Q32	2SB663R,S	TRANSISTOR	R29 QRD161J-102 RESISTOR							
C77	QFN41HJ-682	M CAPACITOR	CN46 PU43351-3Y CAP HOUSING	CN101 PGZ00664 OSC BLOCK	Q33	2SC2878A,B	TRANSISTOR	R30 QRD161J-102 RESISTOR							
C78	QFN41HJ-682	M CAPACITOR	CN102 PU53811 HOOK(X8), X2	D1 D90 DIODE			R31 QRD161J-102 RESISTOR								
C79	QER41CM-476	E CAPACITOR	CN103 PU32908 SERVO PWB STAY	D2 D90 DIODE			R32 QRD161J-100 RESISTOR								
C80	QER41CM-476	E CAPACITOR	▲ CP1 ICP-F10 CIRCUIT PROTECTOR	D3 D90 DIODE			R33 QRD161J-152 RESISTOR								
C81	QFN61HJ-475	M CAPACITOR	▲ CP2 ICP-F10 CIRCUIT PROTECTOR	D4 D90 DIODE			R34 QRD161J-332 RESISTOR								
C82	QFN41HJ-475	M CAPACITOR	CN111 PU43351-2 CAP HOUSING	D5 RD2.0E8 ZENER DIODE			R35 QRD161J-332 RESISTOR								
C85	QVF41HJ-484	TF CAPACITOR	CN112 PU43351-4 CAP HOUSING	D6 RD2.0E8 ZENER DIODE			R36 QRD161J-472 RESISTOR								
C86	QVF41HJ-484	TF CAPACITOR	CN113 PU43351-4R CAP HOUSING	D7 ISS133 DIODE			R37 QRD161J-100 RESISTOR								
C87	QEB41HM-104	E CAPACITOR	CN114 PU43351-3R CAP HOUSING	OR MA165 DIODE			R38 QRD161J-152 RESISTOR								
C88	QEB41HM-104	E CAPACITOR	CN115 PU43351-2 CAP HOUSING	D8 ISS133 DIODE			R39 QRD161J-104 RESISTOR								
C89	QEB41HM-334	E CAPACITOR	CN116 PU43351-2R CAP HOUSING	D9 ISS133 DIODE			R40 QRD161J-104 RESISTOR								
C90	QEB41HM-334	E CAPACITOR	PNBWA PGE100948-04 FM AUD.PWB ASSY	D10 ISS133 DIODE			R41 QRD161J-102 RESISTOR								
C91	QER41CM-106	E CAPACITOR	PNBWA PGE100948-04 FM AUD.PWB ASSY	OR MA165 DIODE			R42 QRD161J-104 RESISTOR								
C92	QER41CM-106	E CAPACITOR	IC1 HAI1752 IC	D11 ISS133 DIODE			R43 QRD161J-682 RESISTOR								
C93	QER41CM-476	E CAPACITOR	IC2 AN6299NK IC	DR MA165 DIODE			R44 QRD161J-682 RESISTOR								
C94	QER41CM-776	E CAPACITOR	IC3 AN3930K IC	D12 ISS133 DIODE			R45 QRD161J-222 RESISTOR								
C95	QFN61HJ-182	M CAPACITOR	IC4 H801951A IC	DR MA165 DIODE			R46 QRD161J-222 RESISTOR								
C96	QFN61HJ-182	M CAPACITOR	IC5 B4634 IC	D13 ISS133 DIODE			R47 QRD161J-562 RESISTOR								
C97	QEU41CM-337	E CAPACITOR	IC6 B4236 IC	DR MA165 DIODE			R48 QRD161J-562 RESISTOR								
C98	QEU41CM-107	E CAPACITOR	IC7 TC4030BP IC	D14 ISS133 DIODE			R49 QRD161J-153 RESISTOR								
C99	QEU41CM-107	E CAPACITOR	IC8 M5218P IC	DR MA165 DIODE			R50 QRD161J-153 RESISTOR								
C100	QCS11HJ-103	CAPACITOR	IC9 M5218P IC	D15 ISS133 DIODE			R51 QRD161J-473 RESISTOR								
			IC10 M5218P IC	DR MA165 DIODE			R52 QRD161J-473 RESISTOR								
C101	QCS11HJ-101	CAPACITOR	IC11 NJM76105D IC	D16 ISS133 DIODE			R53 QRD161J-153 RESISTOR								
C102	QER41EM-475	E CAPACITOR	IC12 AN6299NK IC	DR MA165 DIODE			R54 QRD161J-153 RESISTOR								
C103	QER41CM-224	E CAPACITOR	IC13 AN3930K IC	D17 RDS.1E82 ZENER DIODE			R55 QRD161J-102 RESISTOR								
C104	QER41CM-226	E CAPACITOR	IC14 H801951A IC	RDS.4E82 ZENER DIODE			R56 QRD161J-102 RESISTOR								
C105	QER41HM-225	E CAPACITOR	IC15 B4634 IC	D18 ISS133 DIODE			R57 QRD161J-102 RESISTOR								
C106	QER41CM-106	E CAPACITOR	IC16 B4236 IC	D19 ISS133 DIODE			R58 QRD161J-102 RESISTOR								
C107	QER41EM-475	E CAPACITOR	IC17 TC4030BP IC	OR MA165 DIODE			R59 QRD161J-152 RESISTOR								
C108	QER41EM-475	E CAPACITOR	IC18 M5218P IC	D20 ISS133 DIODE			R60 QRD161J-152 RESISTOR								
C113	QVF41HJ-153M	TF CAPACITOR	IC19 M5218P IC	DR MA165 DIODE			R61 QRD161J-182 RESISTOR								
C114	QVF41HJ-153M	TF CAPACITOR	IC20 M5218P IC	D21 ISS133 DIODE			R62 QRD161J-182 RESISTOR								
C115	QER41EM-475	E CAPACITOR	IC21 M5218P IC	DR MA165 DIODE			R63 QRD161J-392 RESISTOR								
C116	QER41EM-475	E CAPACITOR	IC22 M5218P IC	D22 ISS133 DIODE			R64 QRD161J-392 RESISTOR								
C117	QCS11HJ-391	CAPACITOR	IC23 M5218P IC	DR MA165 DIODE			R65 QRD161J-682 RESISTOR								
C118	QCS11HJ-391	CAPACITOR	IC24 M5218P IC	D23 RD8.8E8 ZENER DIODE			R66 QRD161J-682 RESISTOR								
C119	QFN41HJ-123	M CAPACITOR	Q1 2SC2021R,S TRANSISTOR	R1 QRD161J-271 RESISTOR			R67 QRD161J-821 RESISTOR								
C120	QFN41HJ-123	M CAPACITOR	Q2 2SC2021R,S TRANSISTOR	R2 QRD161J-102 RESISTOR			R68 QRD161J-821 RESISTOR								
			Q3 2SC2647C TRANSISTOR	R3 QRD161J-392 RESISTOR			R69 QRD161J-123 RESISTOR								
C401	QER41EM-475	E CAPACITOR	Q4 2SC2647C TRANSISTOR	R4 QRD161J-392 RESISTOR			R70 QRD161J-123 RESISTOR								
C402	QER41EM-475	E CAPACITOR	Q5 2SC2021R,S TRANSISTOR	R5 QRD161J-100 RESISTOR			R71 QRD161J-392 RESISTOR								
C403	QFN41HJ-472	M CAPACITOR	Q6 2SC2647C TRANSISTOR	R6 QRD161J-100 RESISTOR			R72 QRD161J-392 RESISTOR								
C404	QFN41HJ-472	M CAPACITOR	Q7 2SC2647C TRANSISTOR	R7 QRD161J-152 RESISTOR			R73 QRD161J-123 RESISTOR								
C405	QFN41HJ-472	M CAPACITOR	Q8 2SB8643Q,R,S TRANSISTOR	R8 QRD161J-152 RESISTOR			R74 QRD161J-123 RESISTOR								
C406	QFN41HJ-472	M CAPACITOR	Q9 2SD0638Q,R,S TRANSISTOR				R75 QRD161G-513 RESISTOR								

#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION
R76	QRD161J-513	RESISTOR	R143 QRD161J-102 RESISTOR	R415 QRD161J-822 RESISTOR	C64 QET61AM-107 E CAPACITOR										
R77	QRD161J-153	RESISTOR	R144 QRD161J-102 RESISTOR	R416 QRD161J-822 RESISTOR	C65 QFN31HK-103 M CAPACITOR										
R78	QRD161J-153	RESISTOR	R145 QRD161J-104 RESISTOR	R417 QRD161J-822 RESISTOR	C66 QFN31HK-103 M CAPACITOR										
R79	QRD161J-562	RESISTOR	R146 QRD161J-104 RESISTOR	R418 QRD161J-822 RESISTOR	C67 QER61AM-336 E CAPACITOR										
R80	QRD161J-562	RESISTOR	R147 QRD161J-681 RESISTOR	C1 QET61AM-476 E CAPACITOR	C68 QET61AM-336 E CAPACITOR										
R81	QVZ3513-332	V RESISTOR	R148 QRD161J-562 RESISTOR	C2 QCF31HP-103 CAPACITOR	C69 OCT05CH-101 CAPACITOR										
R82	QVZ3513-332	V RESISTOR	R149 QRD161J-182 RESISTOR	C3 QCF31HP-473 CAPACITOR	C70 OCT05CH-101 CAPACITOR										
R83	QRD161J-224	RESISTOR	R150 QRD161J-182 RESISTOR	C4 QCF31HP-103 CAPACITOR	C71 QET61AM-336 E CAPACITOR										
R84	QRD161J-224	RESISTOR	R151 QVZ3513-154 V RESISTOR	C5 QCF31HP-103 CAPACITOR	C72 QET61AM-336 E CAPACITOR										
R85	QVZ3513-332	V RESISTOR	R152 QVZ3513-154 V RESISTOR	C6 QCF31HP-103 CAPACITOR	C73 QFN31HJ-182 M CAPACITOR										
R86	QVZ3513-332	V RESISTOR	R153 QRD161J-274 RESISTOR	C7 QCS31HJ-221 CAPACITOR	C74 QFN31HJ-182 M CAPACITOR										
R87	QRD161J-125	RESISTOR	R154 QRD161J-274 RESISTOR	C8 QCS31HJ-221 CAPACITOR	C75 QER61CM-476 E CAPACITOR										
R88	QRD161J-822	RESISTOR	R155 QRD161J-183 RESISTOR	C9 QCF31HP-223 CAPACITOR	C76 QET61AM-107 E CAPACITOR										
R89	QRD161J-182	RESISTOR	R156 QRD161J-183 RESISTOR	C10 QCF31HP-223 CAPACITOR	C77 QET61AM-336 E CAPACITOR										
R90	QRD161J-182	RESISTOR	R157 QRD161J-561 RESISTOR	C11 QET61HM-105 E CAPACITOR	C78 QET61AM-336 E CAPACITOR										
R91	QRD161J-472	RESISTOR	R159 QRD161J-102 RESISTOR	C12 QET61HM-105 E CAPACITOR	C79 QFN31HK-392 M CAPACITOR										
R92	QRD161J-472	RESISTOR	R160 QRD161J-100 RESISTOR	C13 QCS31HJ-331 CAPACITOR	C80 QFN31HJ-392 M CAPACITOR										
R93	QRD161J-222	RESISTOR	R161 QRD161J-682 RESISTOR	C14 QCS31HJ-390 CAPACITOR	C81 QET61EM-335 E CAPACITOR										
R94	QRD161J-222	RESISTOR	R162 QRD161J-682 RESISTOR	C15 QCF31HP-103 CAPACITOR	C82 QER61CM-476 E CAPACITOR										
R95	QVZ3513-103	V RESISTOR	R163 QRD161J-102 RESISTOR	C16 QCF31HP-103 CAPACITOR	C83 QCS31HJ-121 CAPACITOR										
R96	QVZ3513-103	V RESISTOR	R164 QRD161J-562 RESISTOR	C17 QET61HM-224 E CAPACITOR	C84 QET61CM-106 E CAPACITOR										
R97	QRD161J-222	RESISTOR	R165 QRD161J-103 RESISTOR	C18 QCF31HP-103 CAPACITOR	C85 QFN31HK-563 M CAPACITOR										
R98	QRD161J-222	RESISTOR	R166 QRD161J-472 RESISTOR	C19 QET61AM-476 E CAPACITOR	C86 QCF31HP-103 CAPACITOR										
R99	QRD161J-334	RESISTOR	R167 QRD161J-563 RESISTOR	C20 QCF31HP-103 CAPACITOR	C87 QCF31HP-103 CAPACITOR										
R100	QRD161J-683	RESISTOR	R168 QRD161J-353 RESISTOR	C21 QCF31HP-103 CAPACITOR	C88 QCF31HP-103 CAPACITOR										
R101	QRD161J-563	RESISTOR	R169 QRD161J-271 RESISTOR	C22 QER40JM-476 CAPACITOR	C89 QCF31HP-103 CAPACITOR										
R102	QRD161J-124	RESISTOR	R170 QRD161J-102 RESISTOR	C23 QCF31HP-223 CAPACITOR	C90 QET61CM-476 E CAPACITOR										
R103	QRD161J-221	RESISTOR	R171 QRD161J-472 RESISTOR	C24 QCF31HP-103 CAPACITOR	C91 QET61CM-224 E CAPACITOR										
R104	QRD161J-221	RESISTOR	R172 QRD161J-223 RESISTOR	C25 QCF31HP-103 CAPACITOR	C92 QET61CM-224 E CAPACITOR										
R105	QVZ3513-472	V RESISTOR	R173 QRD161J-102 RESISTOR	C26 QFN31HJ-392 M CAPACITOR	C93 QET61CM-224 E CAPACITOR										
R106	QVZ3513-472	V RESISTOR	R174 QRD161J-271 RESISTOR	C27 QCF31HP-222 CAPACITOR	C94 QET61CM-224 E CAPACITOR										
R107	QRD161J-104	RESISTOR	R175 QRD161J-271 RESISTOR	C28 QCF31HP-103 CAPACITOR	C95 QER61CM-476 E CAPACITOR										
R108	QRD161J-104	RESISTOR	R176 QRD161J-103 RESISTOR	C29 QCF31HP-103 CAPACITOR	C96 QER61CM-476 E CAPACITOR										
R109	QRD161J-104	RESISTOR	R177 QRD161J-103 RESISTOR	C30 QCF31HP-103 CAPACITOR	C97 QEPAIEM-475 NP E CAPACITOR										
R110	QRD161J-104	RESISTOR	R178 QRD161J-352 RESISTOR	C31 QET61HM-225 E CAPACITOR	C98 QEPAIEM-475 NP E CAPACITOR										
R111	QRD161J-102	RESISTOR	R179 QRD161J-352 RESISTOR	C32 QET61HM-225 E CAPACITOR	C99 QEPAIEM-475 NP E CAPACITOR										
R112	QRD161J-102	RESISTOR	R180 QRD161J-223 RESISTOR	C33 QER61HM-225 E CAPACITOR	C100 QER61AM-224 E CAPACITOR										
R113	QRD161J-392	RESISTOR	R181 QRD161J-223 RESISTOR	C34 QET61HM-225 E CAPACITOR	C101 QEPAIEM-475 NP E CAPACITOR										
R114	QRD161J-392	RESISTOR	R182 QRD161J-103 RESISTOR	C35 QET61HM-106 E CAPACITOR	C102 QEPAIEM-475 NP E CAPACITOR										
R115	QRD161J-102	RESISTOR	R183 QRD161J-103 RESISTOR	C36 QET61HM-106 E CAPACITOR	C103 QER61AM-224 E CAPACITOR										
R116	QRD161J-102	RESISTOR	R184 QRD161J-103 RESISTOR	C37 QER61HM-224 E CAPACITOR	C104 QER61AM-224 E CAPACITOR										
R117	QRD161J-273	RESISTOR	R185 QRD161J-333 RESISTOR	C38 QER61HM-224 E CAPACITOR	C105 QER61EM-475 E CAPACITOR										
R118	QRD161J-273	RESISTOR	R186 QRD161J-333 RESISTOR	C39 QET61HM-106 E CAPACITOR	C106 QER61EM-475 E CAPACITOR										
R119	QRD161J-273	RESISTOR	R187 QRD161J-562 RESISTOR	C40 QET61HM-106 E CAPACITOR	C107 QFN31HK-332 M CAPACITOR										
R120	QRD161J-273	RESISTOR	R188 QRD161J-472 RESISTOR	C41 QET61CM-106 E CAPACITOR	C108 QFN31HK-332 M CAPACITOR										
R121	QRD161J-123	RESISTOR	R189 QRD161J-154 RESISTOR	C42 QET61CM-106 E CAPACITOR	C109 QFN31HK-102 M CAPACITOR										
R122	QRD161J-123	RESISTOR	R190 QRD161J-102 RESISTOR	C43 QFN31HK-122 M CAPACITOR	C110 QFN31HK-102 M CAPACITOR										
R123	QRD161J-473	RESISTOR	R191 QRD161J-153 RESISTOR	C44 QFN31HK-122 M CAPACITOR	C111 QFN31HK-273 M CAPACITOR										
R124	QRD161J-473	RESISTOR	R192 QRD161J-153 RESISTOR	C45 QFN31HK-103 M CAPACITOR	C112 QFN31HK-273 M CAPACITOR										
R125	QRD161J-103	RESISTOR	R193 QRD161J-223 RESISTOR	C46 QFN31HK-103 M CAPACITOR	C113 QET41CM-224 E CAPACITOR										
R126	QRD161J-103	RESISTOR	R194 QRD161J-223 RESISTOR	C47 QCS31HJ-151 CAPACITOR	C114 QET61CM-106 E CAPACITOR										
R127	QRD161J-102	RESISTOR	R195 QRD161J-182 RESISTOR	C48 QCS31HJ-151 CAPACITOR	C115 QET61EM-335 E CAPACITOR										
R128	QRD161J-102	RESISTOR	R196 QRD161J-182 RESISTOR	C49 QET61AM-336 E CAPACITOR	C116 QER61CM-476 E CAPACITOR										
R129	QRD161J-122	RESISTOR	R401 QRD161J-273 RESISTOR	C50 QET61AM-336 E CAPACITOR	C117 QET61CM-227 E CAPACITOR										
R130	QRD161J-122	RESISTOR	R402 QRD161J-273 RESISTOR	C51 QET61AM-336 E CAPACITOR	C118 QET61CM-227 E CAPACITOR										
R131	QRD161J-124	RESISTOR	R403 QRD161J-273 RESISTOR	C52 QET61AM-336 E CAPACITOR	C119 QET61CM-106 E CAPACITOR										
R132	QRD161J-124	RESISTOR	R404 QRD161J-273 RESISTOR	C53 QFN31HK-333 M CAPACITOR	C120 QER61CM-476 E CAPACITOR										
R133	QRD161J-124	RESISTOR	R405 QRD161J-273 RESISTOR	C54 QFN31HK-333 M CAPACITOR	C121 QER61CM-476 E CAPACITOR										
R134	QRD161J-124	RESISTOR	R406 QRD161J-273 RESISTOR	C55 QET61HM-225 E CAPACITOR	C122 QCS31HJ-680 CAPACITOR										
R135	QRD161J-333	RESISTOR	R407 QRD161J-273 RESISTOR	C56 QET61HM-225 E CAPACITOR	C123 QCS31HJ-680 CAPACITOR										
R136	QRD161J-333	RESISTOR	R408 QRD161J-273 RESISTOR	C57 QFN31HK-153 M CAPACITOR	C124 QCF31HP-102 CAPACITOR										
R137	QRD161J-333	RESISTOR	R409 QRD161J-822 RESISTOR	C58 QFN31HK-153 M CAPACITOR	C125 QCF31HP-102 CAPACITOR										
R138	QRD161J-333	RESISTOR	R410 QRD161J-822 RESISTOR	C59 QET61AM-336 E CAPACITOR	C126 QER61EM-475 E CAPACITOR										
R139	QRD161J-333	RESISTOR	R411 QRD161J-822 RESISTOR	C60 QET61AM-336 E CAPACITOR	C127 QER61EM-475 E CAPACITOR										
R140	QRD161J-561	RESISTOR	R412 QRD161J-822 RESISTOR	C61 QET61AM-336 E CAPACITOR	C128 QER61EM-475 E CAPACITOR										
R141	QVZ3513-682	V RESISTOR	R413 QRD161J-822 RESISTOR	C62 QET61AM-336 E CAPACITOR	C129 QER61CM-106 E CAPACITOR										
R142	QVZ3513-682	V RESISTOR	R414 QRD161J-822 RESISTOR	C63 QET61CM-476 E CAPACITOR	C130 QER61CM-476 E CAPACITOR										

REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION
C133	QCF51HP-103	CAPACITOR	△ CP1	ICP-F10	CIRCUIT PROTECTOR	△ IC3	STR2012A	IC	△ Q1	2SD985	TRANSISTOR
C401	QEPA1EM-475	NP E CAPACITOR	△ CP2	ICP-F10	CIRCUIT PROTECTOR	D1	RD6.8E83	ZENER DIODE	△ D1	6.2.8	SYSTEM CONTROL CIRCUIT ASSEMBLY <08>
C402	QEPA1EM-475	NP E CAPACITOR				D3	TF520M	THYRISTOR	△ D2	TC4021B	
C403	QEPA1EM-475	NP E CAPACITOR				△ DA1	RB601F	DIODE	△ D3	UPD4021BC	
C404	QEPA1EM-475	NP E CAPACITOR				△ DA2	RB601F	DIODE	△ D4	TD4021B	
C405	QER61CM-476	E CAPACITOR				R1	QR0127J-271	RESISTOR	△ IC1	HD14021B	IC
C406	QER61CM-476	E CAPACITOR				R2	QVZ3506-331	V RESISTOR	△ IC2	TC4021B	IC
C407	QER61CM-476	E CAPACITOR				R3	QR0167J-272	RESISTOR	△ IC3	HD14021B	IC
C408	QER61CM-476	E CAPACITOR				R4	QRD167J-102	RESISTOR	△ IC4	UPD4021BC	IC
C409	QER61CM-476	E CAPACITOR				R6	QRD167J-222	RESISTOR	△ IC5	HD14021B	IC
C410	QER61CM-476	E CAPACITOR	PWBA	PGE30012A-1	REAR-1 PWB ASSY	△ C1	QFH52AM-224	MM CAPACITOR	△ IC6	TC4021B	IC
C411	QCS31HJ-780	CAPACITOR	Q1	OTC144EF	TRANSISTOR	C2	QEL71HR-478	E CAPACITOR	△ IC7	UPC158C	IC
C412	QCS31HJ-780	CAPACITOR	R1	QRD167J-750	RESISTOR	C3	QET41HM-107	E CAPACITOR	△ IC8	HDE683P	IC
C413	QCS31HJ-680	CAPACITOR				C4	QET41EM-108	E CAPACITOR	△ IC9	M74LS373P	IC
C414	QCS31HJ-680	CAPACITOR				C5	QET41HM-107	E CAPACITOR	△ IC10	HD74LS373P	IC
C415	QER61CM-476	E CAPACITOR				C6	QET41EM-108	E CAPACITOR	△ IC10	PGD30007-12	IC
C416	QER61CM-476	E CAPACITOR				C7	QET41HM-107	E CAPACITOR			
L1	PU53223-101J	PEAKING COIL				C8	QET41EM-108	E CAPACITOR			
L2	PU53223-101J	PEAKING COIL				△ C9	QFH52AM-224	MM CAPACITOR			
L3	PU53223-101J	PEAKING COIL	PWBA	PGE30150A	REAR-2 PWB ASSY	C10	QEL71VR-688	E CAPACITOR			
L4	PU53223-221J	PEAKING COIL	R1	QRD167J-472	RESISTOR	C11	QCF11MP-223	CAPACITOR			
L5	PU53223-271J	PEAKING COIL	R2	QRD167J-822	RESISTOR	C12	QET41CM-227	E CAPACITOR			
L7	PU58308-152J	COIL	R3	QRD167J-103	RESISTOR	C13	QET41CM-227	E CAPACITOR			
L8	PU58308-152J	COIL				C14	QCF11MP-223	CAPACITOR			
L9	PU58308-222J	COIL				C15	QET41CM-227	E CAPACITOR			
L10	PU58308-222J	COIL				C16	QCF11MP-223	CAPACITOR			
L11	PU53223-271J	PEAKING COIL				C17	QET41EM-106	E CAPACITOR			
BPFF1	PU56177-3	BAND PASS FILTER				C18	QET41EM-226	E CAPACITOR			
BPFF2	PU56177-4	BAND PASS FILTER				C19	QET41EM-106	E CAPACITOR			
BPFF3	PU56177-3	BAND PASS FILTER				C20	QFN41HK-104	M CAPACITOR			
TH1	ERT-D2FHL202S	THERMISTOR				△ L1	PGZ00139-331	CHOKE COIL			
TH2	ERT-D2FHL202S	THERMISTOR				△ L2	PGZ00139-331	CHOKE COIL			
TH3	ERT-D2FHL202S	THERMISTOR	△ PWBA	PGE20044	VR BOARD PWB	△ L3	PGZ00139-331	CHOKE COIL			
TH4	ERT-D2FHL202S	THERMISTOR	Q1	OTC124EF	TRANSISTOR	△ L4	PGZ00139-331	CHOKE COIL			
TH5	ERT-D2FHL103S	THERMISTOR				△ L5	PGZ00139-331	CHOKE COIL			
TH6	ERT-D2FHL103S	THERMISTOR				△ L6	PGZ00139-331	CHOKE COIL			
T1	PU56175	S.TRANS(T1,2)	R1	QRD167J-391	RESISTOR	△ HS1	PG040116	HEAT SINK			
CL1	PU54969-2	WIRE CLAMP, X4	△ R2	QRD121J-151	RESISTOR	SCW1	GBST3008Z	TH.TAP.SCREW			
SLD2	PGD40138	SHIELD CASE(2)	△ R3	QRD121J-151	RESISTOR	SCW2	SPSP3010Z	SCREW			
SLD3	PGD40139	SHIELD CASE(3)	△ R4	QRD121J-151	RESISTOR	SPC1	PGZ00151	TR SPACER			
TP1	PU54983	TEST PIN(TP1-26)				TP1	PU56008	TEST-PIN(TP1-8)			
CN1	PU43351-4	CAP HOUSING				△ CN1	PUS0597-3	CAP HOUSING	Q1	DTA124EF	TRANSISTOR
CN2	PU43351-3	CAP HOUSING				△ CN2	PUS0597-3	CAP HOUSING	Q2	DTC124EF	TRANSISTOR
CN5	PU43351-2	CAP HOUSING				CN4	PU43351-6	CAP HOUSING	Q4	DTA124EF	TRANSISTOR
CN6	PU43351-2	CAP HOUSING	△ PWBA	PU53259-1-2	F.E.HEAD PWB	CN5	PU43351-4Y	CAP HOUSING	Q5	DTC124EF	TRANSISTOR
CN7	PU43351-3	CAP HOUSING	IC1	HMC-230	IC	CN6	PU43351-4R	CAP HOUSING	Q6	DTA124EF	TRANSISTOR
CN8	PU43351-3	CAP HOUSING	C1	QFP42AG-363	P CAP	CN7	PU43351-2R	CAP HOUSING	Q7	DTC124EF	TRANSISTOR
CN9	PU43351-2Y	CAP HOUSING				CN8	PU43351-9	CAP HOUSING	Q8	DTA124EF	TRANSISTOR
CN10	PU43351-2R	CAP HOUSING				CN9	PU43351-7	CAP HOUSING	Q9	DTC124EF	TRANSISTOR
CN11	PU43351-4R	CAP HOUSING				CN10	PU43351-2	CAP HOUSING	Q10	DTC124EF	TRANSISTOR
CN12	PU43351-2	CAP HOUSING				△ CN11	PU43351-2	CAP HOUSING	Q11	DTA124EF	TRANSISTOR
CN13	PU43351-3Y	CAP HOUSING				CN12	PU43351-2	CAP HOUSING	Q12	DTA124EF	TRANSISTOR
CN14	PU43351-2R	CAP HOUSING				CN13	PU43351-2Y	CAP HOUSING	Q13	DTA124EF	TRANSISTOR
CN15	PU43351-4R	CAP HOUSING				△ CN14	PU43351-2	CAP HOUSING	Q14	DTC124EF	TRANSISTOR
CN16	PU43351-4	CAP HOUSING				CN15	PU43351-2R	CAP HOUSING	Q15	DTA124EF	TRANSISTOR
CN17	PU43351-2	CAP HOUSING				△ CN16	2SB907		Q16	2SB907	TRANSISTOR
CN41	PU43351-3Y	CAP HOUSING	PWBA	PGE200308-4	REG.PWB ASS'Y	△ CN17	2SB907		Q17	2SB907	TRANSISTOR
CN42	PU43351-3R	CAP HOUSING	△ IC1	STR2012A	IC	△ CN18	DTA124EF		Q18	DTA124EF	TRANSISTOR
CN101	PU52104	TAPPING SUPPORT, X2	△ IC2	STR2012A	IC				D1	ISS133	DIODE
									D2	ISS133	DIODE
									D3	RD6.2E82	ZENER DIODE

#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION
D5	ISS133	DIODE		R61	QRD167J-472	RESISTOR		C29	QCS11HJ-5R0	CAPACITOR		Q11	ZSC8745S	TRANSISTOR	
D6	ISS133	DIODE		R62	QRD167J-472	RESISTOR		C30	QCS11HJ-330	CAPACITOR		Q12	ZSC2647C	TRANSISTOR	
D7	ISS133	DIODE		R63	QRD167J-472	RESISTOR		C31	QCF11HP-223	CAPACITOR		Q13	ZSC2647C	TRANSISTOR	
D8	ISS133	DIODE		R64	QRD167J-472	RESISTOR		C32	QCR11HP-223	CAPACITOR		Q14	ZSC8745S	TRANSISTOR	
D9	ISS133	DIODE		R65	QRD167J-472	RESISTOR		X1	PU67931	CRYSTAL RESONATOR		Q15	ZSC2647C	TRANSISTOR	
D10	ISS133	DIODE		R66	QRD167J-472	RESISTOR		CL1	PU54969-2	WIRE CLAMP		Q16	ZSC2647C	TRANSISTOR	
D11	ISS133	DIODE		R67	QRD167J-472	RESISTOR		SCW1	GBST3006Z	TH.TAP.SCREW, X6		Q17	ZSC8745S	TRANSISTOR	
R1	QRD167J-104	RESISTOR		R68	QRD167J-472	RESISTOR		SKT1	PG200003-2	IC SOCKET		D3	ERB12-D2	DIODE	
R2	QRD167J-103	RESISTOR		R69	QRD167J-472	RESISTOR		DR PG200083	IC SOCKET		D4	ISS133	DIODE		
R3	QRD167J-103	RESISTOR		R70	QRD167J-472	RESISTOR		DR PG200147-028	IC SOCKET		R1	QVZ3506-222	V RESISTOR		
R4	QRD167J-103	RESISTOR		R71	QRD167J-472	RESISTOR		DR PG200331-028	IC SOCKET		R2	QVZ3506-102	V RESISTOR		
R5	QRD167J-103	RESISTOR		R72	QRD167J-472	RESISTOR		CN2	PU43351-9	CAP HOUSING		R3	QRD167J-101	RESISTOR	
R6	QRD167J-103	RESISTOR		R73	QRD167J-472	RESISTOR		CN3	PU43351-8R	CAP HOUSING		R4	QRD167J-422	RESISTOR	
R7	QRD167J-104	RESISTOR		R75	QRD167J-473	RESISTOR		CN4	PU43351-11	CAP HOUSING		R5	QRD167J-472	RESISTOR	
R8	QRD167J-222	RESISTOR		R76	QRD167J-222	RESISTOR		CN5	PU43351-2	CAP HOUSING		R6	QRD167J-222	RESISTOR	
R9	QRD167J-222	RESISTOR		R77	QRD167J-473	RESISTOR		CN6	PU43351-2R	CAP HOUSING		R7	QRD167J-223	RESISTOR	
R10	QRD167J-222	RESISTOR		R78	QRD167J-222	RESISTOR		CN7	PU43351-6	CAP HOUSING		R8	QRD167J-223	RESISTOR	
R11	QRD167J-103	RESISTOR		R79	QRD167J-104	RESISTOR		CN8	PU43351-3	CAP HOUSING		R9	QRD167J-422	RESISTOR	
R12	QRD167J-103	RESISTOR		R81	QRD167J-103	RESISTOR		CN9	PU43351-9	CAP HOUSING		R10	QRD167J-472	RESISTOR	
R13	QRD167J-103	RESISTOR		R82	QRD167J-152	RESISTOR		CN10	PU43351-7	CAP HOUSING		R11	QRD167J-SR9	RESISTOR	
R14	QRD167J-103	RESISTOR		R83	QRD167J-681	RESISTOR		CN11	PU43351-10	CAP HOUSING		R12	QRD167J-SR9	RESISTOR	
R15	QRD167J-333	RESISTOR		R84	QRD167J-154	RESISTOR		CN12	PU43351-9R	CAP HOUSING		R13	QRD167J-151	RESISTOR	
R16	QRD167J-103	RESISTOR		R85	QRD167J-103	RESISTOR		CN13	PU43351-9	CAP HOUSING		R14	QRD167J-151	RESISTOR	
A R17	QRD12J-151	RESISTOR		R86	QRD167J-103	RESISTOR		CN14	PU43351-7	CAP HOUSING		R15	QVZ3506-681	V RESISTOR	
R18	QRD167J-184	RESISTOR		R87	QRD167J-272	RESISTOR		CN15	PU43351-8	CAP HOUSING		R16	QRD167J-273	RESISTOR	
R19	QRD167J-472	RESISTOR		R88	QRD167J-473	RESISTOR		CN16	PU43351-6	CAP HOUSING		R17	QRD167J-471	RESISTOR	
R20	QRD167J-224	RESISTOR		R89	QRD167J-104	RESISTOR		CN17	PU43351-4	CAP HOUSING		R18	QRD167J-223	RESISTOR	
R21	QRD167J-222	RESISTOR		R91	QRD167J-103	RESISTOR		CN18	PU43351-6	CAP HOUSING		R19	QRD167J-822	RESISTOR	
R22	QRD167J-103	RESISTOR		R92	QRD167J-103	RESISTOR		CN19	PU43351-3	CAP HOUSING		R20	QRD167J-682	RESISTOR	
R23	QRD167J-103	RESISTOR		R93	QRD167J-391	RESISTOR		CN20	PU43351-3R	CAP HOUSING		R21	QVZ3506-222	V RESISTOR	
R24	QRD167J-104	RESISTOR		R100	QRD187J-1R0	RESISTOR		CN23	PU43351-2	CAP HOUSING		R22	QRD167J-271	RESISTOR	
R25	QRD167J-103	RESISTOR		R101	QRD187J-1R0	RESISTOR		CN24	PU43351-12	CAP HOUSING		R23	QRD167J-681	RESISTOR	
R26	QRD167J-103	RESISTOR		R102	QRD167J-104	RESISTOR		CN25	PU43351-2R	CAP HOUSING		R24	QRD167J-822	RESISTOR	
R27	QRD167J-103	RESISTOR		R1	EXB-P83104M	RESISTOR ARRAY		CN26	PU43351-7	CAP HOUSING		R25	QRD167J-333	RESISTOR	
R28	QRD167J-103	RESISTOR		R2	EXB-P86104M	RESISTOR ARRAY		CN27	PU43351-9Y	C HOUSING		R26	QRD167J-223	RESISTOR	
R29	QRD167J-104	RESISTOR		R3	EXB-P84104M	RESISTOR ARRAY		CN29	PU43351-7	CAP HOUSING		R27	QRD167J-471	RESISTOR	
R30	QRD167J-103	RESISTOR		R4	EXB-P83103M	NETWORK RESISTOR		CN101	PGD30111	SYS PWB STAY(1)		R28	QVZ3506-681	V RESISTOR	
R31	QRD167J-103	RESISTOR		R5	EXB-P83104M	RESISTOR ARRAY		CN102	PGD30112	SYS PWB STAY(2)		R29	QRD167J-273	RESISTOR	
R32	QRD167J-103	RESISTOR		R6	EXB-P84104M	RESISTOR ARRAY						R30	QRD167J-104	RESISTOR	
R33	QRD167J-103	RESISTOR		C1	QET41EM-474	E CAPACITOR						R31	QRD167J-332	RESISTOR	
R34	QRD167J-103	RESISTOR		C2	QET41CM-474	E CAPACITOR						R33	QRD167J-101	RESISTOR	
R35	QRD167J-103	RESISTOR		C3	QET41CM-107	E CAPACITOR						R34	QVZ3506-672	V RESISTOR	
R36	QRD167J-124	RESISTOR		C4	QET41CM-226	E CAPACITOR						R35	QRD167J-102	RESISTOR	
R37	QRD167J-124	RESISTOR		C5	QFN41HK-103	M CAPACITOR						R36	QRD167J-103	RESISTOR	
R38	QRD167J-333	RESISTOR		C6	QFN41HK-103	M CAPACITOR						R37	QRD167J-481	RESISTOR	
R39	QRD167J-333	RESISTOR		C7	QFN41HK-103	M CAPACITOR						R38	QRD167J-472	RESISTOR	
R40	QRD167J-563	RESISTOR		C8	QFN41HK-103	M CAPACITOR						R39	QRD167J-222	RESISTOR	
R41	QRD167J-391	RESISTOR		C9	QFN41HK-103	M CAPACITOR						R40	QRD167J-682	RESISTOR	
R42	QRD167J-333	RESISTOR		C10	QFN41HK-124	M CAPACITOR									
R43	QRD167J-333	RESISTOR		C11	QFN41HK-223	M CAPACITOR		IC1	EHM-822A29	IC		R41	QRD167J-103	RESISTOR	
R44	QRD167J-154	RESISTOR		C12	QCS11HJ-220	CAPACITOR		IC2	AN4330	IC		R42	QRD167J-222	RESISTOR	
R45	QRD167J-103	RESISTOR		C13	QCS11HJ-220	CAPACITOR		IC4	HAI1702	IC		R43	QRD167J-221	RESISTOR	
R46	QRD167J-472	RESISTOR		C14	QCF11HP-473	CAPACITOR		IC5	TA7347P	IC		R44	QRD167J-561	RESISTOR	
R47	QRD167J-473	RESISTOR		C15	QER41HM-225	E CAPACITOR		IC7	AN607P	IC		R45	QRD167J-561	RESISTOR	
R48	QRD167J-223	RESISTOR		C16	QCF11HP-473	CAPACITOR		IC8	VC2011	IC		R46	ORG19J-221	DMF RESISTOR	
R49	QRD167J-333	RESISTOR		C17	QET41AM-227	E CAPACITOR		IC9	EHM-822A29	IC		R47	QRD167J-103	RESISTOR	
R50	QRD167J-473	RESISTOR		C18	QCF11HP-473	CAPACITOR						R48	QRD167J-152	RESISTOR	
R52	QRD167J-103	RESISTOR		C19	QCF11HP-473	CAPACITOR		Q1	ZSC2647C	TRANSISTOR		R49	QRD167J-182	RESISTOR	
R53	QRD167J-103	RESISTOR		C20	QFN41HK-103	M CAPACITOR		Q2	ZSB8745S	TRANSISTOR		R50	QRD167J-391	RESISTOR	
R54	QRD167J-103	RESISTOR		C21	QCF11HP-473	CAPACITOR		Q3	ZSB8745S	TRANSISTOR					
R55	QRD167J-104	RESISTOR		C23	QCS11HJ-101	CAPACITOR		Q4	ZSC2377D	TRANSISTOR		R51	QRD167J-561	RESISTOR	
R56	QRD167J-684	RESISTOR		C24	QFN41HK-104	M CAPACITOR		Q5	ZSC2377D	TRANSISTOR		R52	QRD167J-152	RESISTOR	
R57	QRD167J-564	RESISTOR		C25	QET41CM-476	E CAPACITOR		Q6	ZSC2647C	TRANSISTOR		R53	QRD167J-561	RESISTOR	
R58	QRD167J-472	RESISTOR		C26	QET41CM-106	E CAPACITOR		Q7	ZSC2647C	TRANSISTOR		R54	QRD167J-102	RESISTOR	
R59	QRD167J-472	RESISTOR		C27	QFN41HK-103	M CAPACITOR		Q8	ZSC2647C	TRANSISTOR		R55	QRD167J-102	RESISTOR	
R60	QRD167J-472	RESISTOR		C28	QFN41HK-154	M CAPACITOR		Q9	ZSC2647C	TRANSISTOR		R56	QRD167J-102	RESISTOR	
								Q10	ZSC2647C	TRANSISTOR		R57	QRD167J-563	RESISTOR	
												R58	QRD167J-223	RESISTOR	

REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION
R50	QRD167J-222	RESISTOR	R118	QRD167J-393	RESISTOR	C60	QFN31HK-103	M CAPACITOR	C127	QFN31HK-103	M CAPACITOR
R51	QRD167J-223	RESISTOR	R119	QRD167J-102	RESISTOR	C61	QCF31HP-223	CAPACITOR	C128	QCF31MP-472	CAPACITOR
R52	QRD167J-471	RESISTOR	R120	QRD167J-392	RESISTOR	C62	QFN31HK-103	M CAPACITOR	C129	QFN31HK-563	M CAPACITOR
R53	QRD167J-152	RESISTOR	R121	QRD167J-274	RESISTOR	C63	QCF31HP-472	CAPACITOR	C130	QCF31HP-223	CAPACITOR
R54	QRD167J-102	RESISTOR	R122	QRD167J-101	RESISTOR	C64	QCS31HJ-391	CAPACITOR	C131	QCF31HP-223	CAPACITOR
R55	QRD167J-221	RESISTOR	R123	QRD167J-103	RESISTOR	C65	QET61HM-225	E CAPACITOR			
R56	QRD167J-332	RESISTOR	R124	QRD167J-103	RESISTOR	C66	QFN31HK-103	M CAPACITOR	A L1	PU48530-221K	PEAKING COIL
R57	QRD167J-561	RESISTOR	R125	QRD167J-561	RESISTOR	C67	QCS31HJ-4R0	CAPACITOR	A L2	PU48530-221K	PEAKING COIL
R58	QRD167J-122	RESISTOR				C68	QAT3001-016	TRIMMER CAPACITOR	A L3	PU48530-221K	PEAKING COIL
R59	QRD167J-152	RESISTOR				C69	QCS31HJ-4R0	CAPACITOR	A L4	PU48530-221K	PEAKING COIL
R60	QRD167J-222	RESISTOR				C70	QFN31HK-103	M CAPACITOR	A L5	PU48530-221K	PEAKING COIL
R61	QRD167J-223	RESISTOR	C1	QET61CM-476	E CAPACITOR	C71	QFN31HK-103	M CAPACITOR	A L6	PU48530-221K	PEAKING COIL
R62	QRD167J-393	RESISTOR	C2	QCF31HP-223	CAPACITOR	C72	QCF31HP-223	CAPACITOR	L7	PU46398-2	COIL
R63	QRD167J-103	RESISTOR	C3	QCS31HJ-560	CAPACITOR	C73	QCF31HP-223	CAPACITOR	L8	PU46003-6R8	COIL
R64	QRD167J-152	RESISTOR	C4	QCS31HJ-560	CAPACITOR	C74	QET61CM-106	E CAPACITOR	A L9	PU48530-221K	PEAKING COIL
R65	QRD167J-102	RESISTOR	C5	QCS31HJ-101	CAPACITOR	C75	QET61CM-104	E CAPACITOR	A L10	PU48530-221K	PEAKING COIL
R66	QRD167J-391	RESISTOR	C6	QFN31HK-103	M CAPACITOR	C76	QCF31HP-223	CAPACITOR			
R67	QRD167J-561	RESISTOR	C7	QFN31HK-333	M CAPACITOR	C77	QFN31HK-103	M CAPACITOR	L11	PU48530-220K	PEAKING COIL
R68	QRD167J-182	RESISTOR	C8	QFN31HK-224	M CAPACITOR	C78	QET61HM-103	E CAPACITOR	L12	PU48530-560K	PEAKING COIL
R69	QRD167J-102	RESISTOR	C9	QET61CM-476	E CAPACITOR	C79	QCF31HP-102	CAPACITOR	L13	PU48530-560K	PEAKING COIL
R70	QRD167J-183	RESISTOR	C10	QCS31HJ-101	CAPACITOR	C80	QCS31HJ-221	CAPACITOR	A L14	PU48530-221K	PEAKING COIL
R71	QRD167J-122	RESISTOR	C11	QFN31HK-103	M CAPACITOR	C81	QCS31HJ-181	CAPACITOR	A L15	PU48530-101K	PEAKING COIL
R72	QRD167J-102	RESISTOR	C12	QET61CM-476	E CAPACITOR	C82	QFN31HK-104	M CAPACITOR	A L16	PU48530-221K	PEAKING COIL
R73	QRD167J-681	RESISTOR	C13	QCS31HJ-103	M CAPACITOR	C83	QET61HM-105	E CAPACITOR	L17	PU30771-6	COIL
R74	QRD167J-563	RESISTOR	C14	QFN31HK-103	M CAPACITOR	C84	QCS31HJ-121	CAPACITOR	A L18	PU48530-221K	PEAKING COIL
R75	QRD167J-184	RESISTOR	C15	QCS31HJ-5R0	CAPACITOR	C85	QFN31HK-185	M CAPACITOR	L19	PU30771-6	COIL
R76	QRD167J-101	RESISTOR	C16	QFN31HK-103	M CAPACITOR	C86	QCF31HP-223	CAPACITOR	A L20	PU48530-221K	PEAKING COIL
R77	QRD167J-103	RESISTOR	C17	QCF31HP-223	CAPACITOR	C87	QET61CM-108	E CAPACITOR	L21	PU48530-560K	PEAKING COIL
R78	QRD167J-393	RESISTOR	C18	QET61CM-476	E CAPACITOR	C88	QFN31HK-102	M CAPACITOR	A L22	PU48530-221K	PEAKING COIL
R79	QRD167J-182	RESISTOR	C19	QFN31HK-103	M CAPACITOR	C89	QET61CM-476	E CAPACITOR	L23	PU48530-560K	PEAKING COIL
R80	QRD167J-222	RESISTOR	C20	QCF31HP-102	CAPACITOR	C90	QCF31HP-223	CAPACITOR	A L24	PU48530-221K	PEAKING COIL
R81	ORD167J-274	RESISTOR	C21	QCF31HP-102	CAPACITOR	C91	QET61CM-476	E CAPACITOR	L25	PU48530-221K	PEAKING COIL
R82	ORD167J-223	RESISTOR	C22	QFN31HK-104	M CAPACITOR	C92	QFN31HK-103	M CAPACITOR	L26	A04725-1000	PEAKING COIL
R83	ORD167J-225	RESISTOR	C23	QCF31HP-223	CAPACITOR	C93	QCS31HJ-820	CAPACITOR	L27	A04725-8200	PEAKING COIL
R85	ORD167J-103	RESISTOR	C24	QET61CM-476	E CAPACITOR	C94	QCF31HP-223	CAPACITOR	EQ1	PU48515-2	EQUALIZER
R86	ORD167J-562	RESISTOR	C25	QFN31HK-103	M CAPACITOR	C95	QCS31HJ-270	CAPACITOR	LPF1	PU48517-2	LOW PASS FILTER
R87	ORD167J-102	RESISTOR	C26	QET61CM-476	E CAPACITOR	C96	QET61CM-476	E CAPACITOR	BPF1	PU48514-2	BAND PASS FILTER
R88	ORD167J-123	RESISTOR	C27	QCF31HP-223	CAPACITOR	C97	QCS31HJ-221	CAPACITOR	BPF2	PUS2489	BAND PASS FILTER
R89	ORD167J-471	RESISTOR	C28	QFN31HK-223	M CAPACITOR	C98	QET61CM-106	E CAPACITOR	BPF3	PUS49465	BAND PASS FILTER
R90	ORD167J-472	RESISTOR	C29	QCF31HP-223	CAPACITOR	C99	QET61CM-476	E CAPACITOR	DL1	PU46321-4A	D LINE
R91	ORD167J-471	RESISTOR	C30	QFN31HK-103	M CAPACITOR	C100	QFN31HK-683	M CAPACITOR	X1	PU31469-6	CRYSTAL RESONATOR
R92	ORD167J-122	RESISTOR	C31	QET61CM-476	E CAPACITOR	C101	QFN31HK-683	M CAPACITOR	X2	PU66040-3	CRYSTAL RESONATOR
R93	ORD167J-562	RESISTOR	C32	QCF31HP-223	CAPACITOR	C102	QET61CM-476	E CAPACITOR	X3	PU42746	CRYSTAL RESONATOR
R94	VZ3506-471	V RESISTOR	C33	QET61CM-476	E CAPACITOR	C103	QCF31HP-223	CAPACITOR	TPI1	PU57545	TEST PIN(TPI1-22)
R95	ORD121J-481	RESISTOR	C34	QFN31HK-223	M CAPACITOR	C104	QCS31HJ-150	CAPACITOR	CN1	PU63351-2	CAP HOUSING
R96	ORD167J-222	RESISTOR	C35	QFN31HK-102	CAPACITOR	C105	QCS31HJ-101	CAPACITOR	CN2	PU63351-2R	CAP HOUSING
R97	ORD167J-222	RESISTOR	C36	QFN31HK-104	M CAPACITOR	C106	QFN31HK-103	M CAPACITOR	CN3	PU63351-5	CAP HOUSING
R98	ORD167J-221	RESISTOR	C37	QCF31HP-223	CAPACITOR	C107	QET61HM-225	E CAPACITOR	CN4	PU63351-5Y	CAP HOUSING
R99	ORD167J-562	RESISTOR	C38	QFN31HK-104	M CAPACITOR	C108	QET61HM-225	E CAPACITOR	CN5	PU63351-3	CAP HOUSING
R100	ORD167J-102	RESISTOR	C39	QCF31HP-223	CAPACITOR	C109	QFN31HK-103	M CAPACITOR	CN6	PU63351-3Y	CAP HOUSING
R101	ORD167J-122	RESISTOR	C40	QET61CM-476	E CAPACITOR	C110	QCS31HJ-150	CAPACITOR	CN8	PU63351-2	CAP HOUSING
R102	ORD167J-102	RESISTOR	C41	QFN31HK-103	M CAPACITOR	C111	QCS31HJ-101	CAPACITOR	CN9	PU63351-3	CAP HOUSING
R103	ORD167J-103	RESISTOR	C42	QCS31HJ-101	CAPACITOR	C112	QCF31HP-223	CAPACITOR	*****	*****	*****
R104	ORD167J-103	RESISTOR	C43	QFN31HK-103	M CAPACITOR	C113	QET61CM-476	E CAPACITOR			
R105	ORD167J-103	RESISTOR	C44	QCF31HP-223	CAPACITOR	C114	QCF31HP-223	CAPACITOR			
R106	ORD167J-222	RESISTOR	C45	QFN31HK-103	M CAPACITOR	C115	QFN31HK-103	M CAPACITOR			
R107	ORD167J-222	RESISTOR	C46	QET61CM-476	E CAPACITOR	C116	QCF31HP-223	CAPACITOR			
R108	ORD167J-221	RESISTOR	C47	QFN31HK-103	M CAPACITOR	C117	QCS31HJ-6R0	CAPACITOR			
R109	ORD167J-182	RESISTOR	C48	QCF31HP-223	CAPACITOR	C118	QAT3001-016	TRIMMER CAPACITOR			
R110	ORD167J-182	RESISTOR	C49	QFN31HK-103	M CAPACITOR	C119	QCS31HJ-4R0	CAPACITOR			
R111	ORD167J-104	RESISTOR	C50	QCF31HP-223	CAPACITOR	C120	QFN31HK-103	M CAPACITOR			
R112	ORD167J-103	RESISTOR	C51	QET61CM-476	E CAPACITOR	C121	QFN31HK-223	M CAPACITOR	*****	*****	*****
R113	ORD167J-562	RESISTOR	C52	QFN31HK-103	M CAPACITOR	C122	QET61CM-104	E CAPACITOR	# 6.2.11 Y AMP.CIRCUIT BOARD ASSEMBLY <1>		
R114	VZ3506-473	V RESISTOR	C53	QFN31HK-103	M CAPACITOR	C123	QCF31HP-223	CAPACITOR	*****	*****	*****
R115	ORD167J-183	RESISTOR	C54	QAT3001-015	TRIMMER CAPACITOR	C124	QCF31HP-223	CAPACITOR			
R116	ORD167J-102	RESISTOR	C55	QCF31HP-223	CAPACITOR	C125	QET61CM-476	E CAPACITOR			
R117	ORD167J-184	RESISTOR	C56	QCS31HJ-120	CAPACITOR	C126	QCF31HP-223	CAPACITOR			
R118	ORD167J-104	RESISTOR	C57	QCS31HJ-121	CAPACITOR	C127	QAT3001-016	TRIMMER CAPACITOR			
R119	ORD167J-103	RESISTOR	C58	QET61CM-476	E CAPACITOR	C128	QCS31HJ-4R0	CAPACITOR			
R120	ORD167J-103	RESISTOR	C59	QCS31HJ-121	CAPACITOR	C129	QCF31HP-223	CAPACITOR			

#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION	#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION	#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION	#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION
IC3	TA7347P	IC		R3	QRD167J-223	RESISTOR		R71	QRD167J-222	RESISTOR		R148	QRD167J-101	RESISTOR	
IC4	TA7347P	IC		R4	QRD167J-101	RESISTOR		R72	QRD167J-471	RESISTOR		R149	QVZ3506-682	V RESISTOR	
IC5	10VT13	IC		R5	QRD167J-103	RESISTOR		R73	QRD167J-222	RESISTOR		R150	QVZ3504-103	V RESISTOR	
IC6	VC2011	IC		R6	QRD167J-471	RESISTOR		R74	QRD167J-391	RESISTOR		R151	QRD167J-221	RESISTOR	
IC7	AN608P	IC		R7	QRD167J-471	RESISTOR		R75	QRD167J-391	RESISTOR		R152	QRD167J-103	RESISTOR	
IC8	TA7347P	IC		R8	QVZ3506-472	V RESISTOR		R76	QRD167J-102	RESISTOR		R153	QRD167J-223	RESISTOR	
Δ IC9	HA11703	IC		R9	QRD167J-123	RESISTOR		R77	QRD167J-272	RESISTOR		R154	QRD167J-223	RESISTOR	
IC10	UPC1163H	IC		R10	QRD167J-562	RESISTOR		R78	QRD167J-561	RESISTOR		R155	QRD167J-103	RESISTOR	
IC11	TA7347P	IC		R11	QVZ3506-103	V RESISTOR		R79	QRD167J-561	RESISTOR		R156	QRD167J-103	RESISTOR	
IC12	MS1454L	IC		R12	QRD167J-123	RESISTOR		R80	QRD167J-562	RESISTOR		R157	QRD167J-222	RESISTOR	
Q1	2SC2647C	TRANSISTOR		R13	QRD167J-392	RESISTOR		R81	QRD167J-122	RESISTOR		R158	QRD167J-680	RESISTOR	
Q2	2SC2647C	TRANSISTOR		R14	QRD167J-332	RESISTOR		R82	QRD167J-122	RESISTOR		R159	QRD167J-560	RESISTOR	
Q3	2SC2647C	TRANSISTOR		R15	QRD167J-331	RESISTOR		R83	QRD167J-123	RESISTOR		R160	QRD167J-103	RESISTOR	
Q4	2SC2647C	TRANSISTOR		R16	QRD167J-561	RESISTOR		R84	QRD167J-102	RESISTOR		R161	QRD167J-102	RESISTOR	
Q5	2SC2647C	TRANSISTOR		R17	QRD167J-222	RESISTOR		R85	QVZ3504-102	V RESISTOR		R162	QRD167J-102	RESISTOR	
Q6	2SC2647C	TRANSISTOR		R18	QRD167J-332	RESISTOR		R86	QRD167J-332	RESISTOR		R163	QRD167J-220	RESISTOR	
Q7	2SC2647C	TRANSISTOR		R19	QRD167J-155	RESISTOR	Δ	R87	PUS2108-6R8K	POSISTOR		R164	PUS2108-6R8K	POSISTOR	
Q8	2SC2647C	TRANSISTOR		R20	QRD167J-105	RESISTOR		R88	QRD167J-332	RESISTOR		R170	QRD167J-101	RESISTOR	
Q9	2SC2647C	TRANSISTOR		R21	QRD167J-105	RESISTOR		R89	QRD167J-563	RESISTOR		C1	QET61CM-476	E CAPACITOR	
Q10	2SC2647C	TRANSISTOR		R22	QVZ3504-473	V RESISTOR		R90	QRD167J-333	RESISTOR		C2	QET61CM-476	E CAPACITOR	
Q11	2SC2647C	TRANSISTOR		R23	QRD167J-153	RESISTOR		R91	QRD167J-184	RESISTOR		C3	QEV41CM-107	E CAPACITOR	
Q12	2SB641Q	TRANSISTOR		R24	QRD167J-153	RESISTOR		R92	QRD167J-103	RESISTOR		C4	QCF31HP-473	CAPACITOR	
Q13	2SC2647C	TRANSISTOR		R25	QRD167J-152	RESISTOR		R93	QVZ3504-472	V RESISTOR		C5	QET61CM-476	E CAPACITOR	
Q14	2SC2647C	TRANSISTOR		R26	QRD167J-102	RESISTOR		R94	QRD167J-562	RESISTOR		C6	QET61CM-476	E CAPACITOR	
Q15	2SC2647C	TRANSISTOR		R27	QRD167J-564	RESISTOR		R95	QRD167J-4R7	RESISTOR		C7	QCF31HP-223	CAPACITOR	
Q16	2SB641Q	TRANSISTOR		R28	QRD167J-472	RESISTOR		R96	QRD167J-4R7	RESISTOR		C8	QET61CM-107	E CAPACITOR	
Q19	2SC2647C	TRANSISTOR		R29	QRD167J-152	RESISTOR		R97	QRD167J-102	RESISTOR		C9	QCS31HJ-270	CAPACITOR	
Q20	2SD638R	TRANSISTOR		R30	QRD167J-122	RESISTOR		R98	QRD167J-562	RESISTOR		C10	QCF31HP-223	CAPACITOR	
Q21	2SD638R	TRANSISTOR		R31	QRD167J-561	RESISTOR		R99	QRD167J-682	RESISTOR		C11	QET61CM-107	E CAPACITOR	
Q23	DTA124EF	TRANSISTOR		R32	QVZ3504-104	V RESISTOR		R104	QRD167J-223	RESISTOR		C12	QCF31HP-223	CAPACITOR	
Q24	2SB643R	TRANSISTOR		R33	QRD167J-103	RESISTOR		R105	QRC12P-820	DMF RESISTOR		C13	QCS31HJ-680	CAPACITOR	
Q25	2SD638R	TRANSISTOR		R34	QRD167J-121	RESISTOR		R106	QRD167J-330	RESISTOR		C14	QAT3D01-017	TRIMMER CAPACITOR	
Q26	2SC2647C	TRANSISTOR		R35	QRD167J-332	RESISTOR		R107	QRD167J-222	RESISTOR		C15	QCF31HP-223	CAPACITOR	
Q27	2SC2647C	TRANSISTOR		R36	QRD167J-101	RESISTOR		R108	QRD167J-123	RESISTOR		C16	QCS31HJ-330	CAPACITOR	
Q28	2SC2647C	TRANSISTOR		R37	QRD167J-102	RESISTOR		R109	QRD167J-750	RESISTOR		C17	PUS1163-471	CAPACITOR	
Q29	2SC2647C	TRANSISTOR		R38	QVZ3504-223	V RESISTOR		R111	QRD167J-102	RESISTOR		C18	QCF31HP-223	CAPACITOR	
Q30	2SC2647C	TRANSISTOR		R39	QVZ3504-102	V RESISTOR		R116	QRD167J-103	RESISTOR		C19	QET61HM-674	E CAPACITOR	
Q31	2SC2647C	TRANSISTOR		R40	QRD167J-102	RESISTOR		R117	QRD167J-103	RESISTOR		C20	QFN31HK-673	M CAPACITOR	
Q32	2SC2647C	TRANSISTOR		R41	QRD167J-391	RESISTOR		R118	QRD167J-103	RESISTOR		C21	QET61CM-336	E CAPACITOR	
Q33	2SC2647C	TRANSISTOR		R42	QRD167J-391	RESISTOR		R119	QRD167J-103	RESISTOR		C22	QCF31HP-223	CAPACITOR	
Q34	2SD638R	TRANSISTOR		R43	QRD167J-222	RESISTOR		R120	QRD167J-334	RESISTOR		C23	QET61CM-107	E CAPACITOR	
Q35	2SC2647C	TRANSISTOR		R44	QRD167J-222	RESISTOR		R121	QRD167J-392	RESISTOR		C24	QFN31HK-563	M CAPACITOR	
D1	ISS133	DIODE		R45	QRD167J-471	RESISTOR		R122	QRD167J-331	RESISTOR		C25	QEN40JM-677	NP E CAPACITOR	
D2	ISS99	DIODE		R46	QRD167J-471	RESISTOR		R123	QRD167J-222	RESISTOR		C26	QET61HM-335	E CAPACITOR	
D3	ISS99	DIODE		R47	QVZ3506-222	V RESISTOR		R126	QRD167J-333	RESISTOR		C27	QET61CM-676	E CAPACITOR	
D4	ISS133	DIODE		R48	QVZ3506-222	V RESISTOR		R127	QRD167J-223	RESISTOR		C28	QCS31HJ-151	CAPACITOR	
D5	ISS133	DIODE		R49	QRD167J-223	RESISTOR		R128	QRD167J-471	RESISTOR		C29	QET61CM-676	E CAPACITOR	
D6	ISS133	DIODE		R50	QRD167J-101	RESISTOR		R129	QRD167J-331	RESISTOR		C30	QCF31HP-223	CAPACITOR	
D7	ISS133	DIODE		R51	QRD167J-102	RESISTOR		R130	QRD167J-331	RESISTOR		C31	QET61CM-676	E CAPACITOR	
D8	ISS133	DIODE		R52	QRD167J-102	RESISTOR		R131	QRD167J-563	RESISTOR		C32	QET61CM-107	E CAPACITOR	
D9	ISS133	DIODE		R53	QRD167J-821	RESISTOR		R132	QRD167J-223	RESISTOR		C33	QCF31HP-223	CAPACITOR	
D10	DA91	DIODE		R54	QRD167J-751	RESISTOR		R133	QVZ3506-471	V RESISTOR		C34	QET61AM-227	E CAPACITOR	
D11	ISS133	DIODE		R55	QRD167J-223	RESISTOR		R134	QVZ3506-471	V RESISTOR		C35	QET61CM-227	E CAPACITOR	
D12	ISS133	DIODE		R56	QRD167J-563	RESISTOR		R135	QRD167J-222	RESISTOR		C36	QCF31HP-223	CAPACITOR	
D15	MA27W(A)	DIODE		R57	QRD167J-561	RESISTOR		R136	QRD167J-222	RESISTOR		C37	QCF31HP-223	CAPACITOR	
D16	R03.3EB2	ZENER DIODE		R58	QRV143F-1620	CMF RESISTOR		R137	QRD167J-391	RESISTOR		C38	QCF31HP-223	CAPACITOR	
D17	ISS133	DIODE		R59	QRD167J-103	RESISTOR		R138	QRD167J-681	RESISTOR		C39	QET61CM-676	E CAPACITOR	
D18	ISS133	DIODE		R60	QRD167J-181	RESISTOR		R139	QRD167J-272	RESISTOR		C40	QET61CM-107	E CAPACITOR	
D19	ISS133	DIODE		R61	QRD167J-222	RESISTOR		R140	QRD167J-391	RESISTOR		C41	QET61CM-676	E CAPACITOR	
D20	ISS133	DIODE		R62	QRD167J-682	RESISTOR		R141	QRD167J-561	RESISTOR		C42	QET61CM-676	E CAPACITOR	
D21	R06.8EB1	ZENER DIODE		R63	QRD167J-182	RESISTOR		R142	QRD167J-392	RESISTOR		C43	QCF31HP-223	CAPACITOR	
D22	ISS133	DIODE		R64	QRD167J-392	RESISTOR		R143	QRD167J-391	RESISTOR		C44	QET61CM-107	E CAPACITOR	
D23	ISS133	DIODE		R65	QRD167J-101	RESISTOR		R144	QRD167J-391	RESISTOR		C45	QCF31HP-223	CAPACITOR	
R1	QRD167J-102	RESISTOR		R66	QRD167J-223	RESISTOR		R145	QRD167J-272	RESISTOR		C46	QCS31HJ-121	CAPACITOR	
R2	QRD167J-101	RESISTOR		R67	QVZ3506-222	V RESISTOR		R146	QRD167J-223	RESISTOR		C47	QCS31HJ-121	CAPACITOR	
				R68	QVZ3506-222	V RESISTOR		R147	QRD167J-103	RESISTOR		C48	QCS31HJ-561	CAPACITOR	
				R69	QRD167J-471	RESISTOR					C49	QFN31HK-103	M CAPACITOR		

REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION	REF NO.	PART NO.	PART NAME, DESCRIPTION
C50	QFN31HK-103	M CAPACITOR	C117	QCF31HP-223	CAPACITOR	A L20	PU48530-221K	PEAKING COIL	A REF NO.	PART NO.	PART NAME, DESCRIPTION
C51	QET61CM-476	E CAPACITOR	C118	QEU41CM-107	E CAPACITOR	A L21	PU48530-221K	PEAKING COIL			
C52	QCF31HP-223	CAPACITOR	C119	QEU41CM-476	E CAPACITOR	A L22	PU48530-221K	PEAKING COIL			
C53	QFN31HK-103	M CAPACITOR	C120	QFN31HK-223	M CAPACITOR	A L23	PU48530-221K	PEAKING COIL			
C54	QCF31HP-223	CAPACITOR	C121	QFN31HK-223	M CAPACITOR	A L24	PU48530-330K	PEAKING COIL			
C55	QET61HM-105	E CAPACITOR	C122	QET61CM-106	E CAPACITOR	A L25	PU48530-221K	PEAKING COIL			
C56	QCS31HJ-331	CAPACITOR	C123	QEU41CM-476	E CAPACITOR	A L26	PU48530-221K	PEAKING COIL			
C57	QET61HM-105	E CAPACITOR	C124	QCF31HP-223	CAPACITOR	A L27	PU48530-221K	PEAKING COIL			
C58	QCF31HP-223	CAPACITOR	C125	QET61CM-107	E CAPACITOR	A L28	PU48530-221K	PEAKING COIL			
C59	QET61CM-476	E CAPACITOR	C126	QCF31HP-223	CAPACITOR	A L29	PU48530-8R2K	PEAKING COIL			
C60	QCF31HP-223	CAPACITOR	C128	QET61CM-476	E CAPACITOR	CT1	PU46042-6	C TRAP			
C61	QET61CM-476	E CAPACITOR	C129	QCS31HJ-271	CAPACITOR	EQ1	PU54129	LOW PASS FILTER			
C62	QET61CM-476	E CAPACITOR	C130	QET61CM-476	E CAPACITOR	EQ2	PU50748	EQUALIZER			
C63	QCF31HP-223	CAPACITOR	C131	QET61CM-476	E CAPACITOR	EQ3	PU54129	LOW PASS FILTER			
C64	QET61CM-107	E CAPACITOR	C132	QCF31HP-223	CAPACITOR	EQ5	PGZ00158	EQUALIZER	R1	QRD182J-331	RESISTOR
C65	QCF31HP-223	CAPACITOR	C133	QCS31HJ-221	CAPACITOR				R2	QRD182J-331	RESISTOR
C66	QET61CM-107	E CAPACITOR	C134	QET61CM-476	E CAPACITOR				R3	QRD182J-331	RESISTOR
C67	QCS31HJ-221	CAPACITOR	C135	QFN31HK-103	M CAPACITOR	LFP1	PU54128	LOW PASS FILTER	R4	QRD182J-331	RESISTOR
C68	QCS31HJ-390	CAPACITOR	C136	QCS31HJ-820	CAPACITOR	LFP2	PU54064	LOW PASS FILTER	R5	QRD182J-331	RESISTOR
C69	QET61CM-476	E CAPACITOR	C137	PU51163-331	CAPACITOR	LFP4	PU54064	LOW PASS FILTER	R6	QRD182J-331	RESISTOR
C70	QCF31HP-223	CAPACITOR	C138	QET61CM-107	E CAPACITOR	LFP5	PU54128	LOW PASS FILTER	S1	PU49344	PUSH SWITCH
C71	QET61CM-107	E CAPACITOR	C139	QCF31HP-223	CAPACITOR	LFP6	PU30192-7D	LOW PASS FILTER	S2	PU49344	PUSH SWITCH
C72	QCF31HP-223	CAPACITOR	C140	QFN41HK-103	M CAPACITOR	RY1	PGZ00430	RELAY	S3	PU49344	PUSH SWITCH
C73	QET61CM-476	E CAPACITOR	C141	QCS31HJ-820	CAPACITOR	TH1	ERT-D2FHK-202S	THERMISTOR	S4	PU49344	PUSH SWITCH
C74	QET61CM-476	E CAPACITOR	C142	QCF31HP-223	CAPACITOR	TP1	PU57545	TEST PIN(TP1-9)	S5	PU49344	PUSH SWITCH
C75	QCF31HP-223	CAPACITOR	C143	QET61CM-107	E CAPACITOR	CN1	PU43351-2R	CAP HOUSING	S6	PU49344	PUSH SWITCH
C76	QCF31HP-223	CAPACITOR	C144	QCF31HP-223	CAPACITOR	CN2	PU43351-2Y	CAP HOUSING	S7	PU49344	PUSH SWITCH
C77	QET61CM-107	E CAPACITOR	C145	QET61CM-107	E CAPACITOR	CN3	PU43351-4	CAP HOUSING	SPC1	PU52848-1-2	LED SPACER
C78	QCF31HP-223	CAPACITOR	C146	QET61CM-476	E CAPACITOR	CN4	PU43351-3R	CAP HOUSING	CN1	PU49215-109Y	CAP HOUSING
C79	QCS31HJ-101	CAPACITOR	C147	QET61HM-225	E CAPACITOR	CN5	PU43351-2R	CAP HOUSING	CN2	PU49215-109	CAP HOUSING
C80	QET61CM-476	E CAPACITOR	C148	QEK41HM-334	E CAPACITOR	CN6	PU43351-5	CAP HOUSING	CN3	PU49215-109R	CAP HOUSING
C81	QET61CM-336	E CAPACITOR	C149	QCF31HP-223	CAPACITOR	CN7	PU43351-3	CAP HOUSING	CN4	PU49215-102R	CAP HOUSING
C82	QET61CM-107	E CAPACITOR	C150	QCF31HP-223	CAPACITOR	CN8	PU43351-5	CAP HOUSING	CN5	PU49215-102	CAP HOUSING
C83	QCF31HP-223	CAPACITOR	C151	QCF31HP-223	CAPACITOR	CN9	PU43351-3	CAP HOUSING	CN6	PU49215-108	CAP HOUSING
C84	PU51163-391	CAPACITOR	C152	QCF31HP-223	CAPACITOR	CN10	PU43351-4	CAP HOUSING	CN7	PU49215-102	CAP HOUSING
C85	QCS31HJ-470	CAPACITOR	C153	QET61CM-476	E CAPACITOR	CN11	- PU43351-2	CAP HOUSING	CN8	PU49215-102R	CAP HOUSING
C86	QEN61CM-476	NP E CAPACITOR	C154	QET61CM-476	E CAPACITOR	CN12	PU43351-4Y	CAP HOUSING	CN9	PU49215-102Y	CAP HOUSING
C87	QET61HM-105	E CAPACITOR	C155	QET61CM-476	E CAPACITOR	CN13	PU43351-3Y	CAP HOUSING	LP1	PU56008	TEST-PIN
C88	QCS31HJ-180	CAPACITOR	C156	QET61CM-476	E CAPACITOR	CN14	PU43351-4Y	CAP HOUSING			
C89	QET61HM-105	E CAPACITOR	C157	QET61HM-475	E CAPACITOR	CN15	PU43351-4R	CAP HOUSING			
C90	QCS31HJ-121	CAPACITOR	C158	QCF31HP-223	CAPACITOR	CN16	PU43351-2Y	CAP HOUSING			
C91	QCS31HJ-121	CAPACITOR	C159	QCF31HP-223	CAPACITOR	-FM DELAY BOARD ASSEMBLY-					
C92	QCS31HJ-180	CAPACITOR	C160	QFN31HK-103	M CAPACITOR	Q36	ZSC2647C	TRANSISTOR			
C93	QET61CM-476	E CAPACITOR	C161	QCS31HJ-540	CAPACITOR	R164	QRO167J-102	RESISTOR	PWBB	PGE40151	END SENSOR PWB
C94	QET61CM-476	E CAPACITOR	C162	QCS31HJ-820	CAPACITOR	R165	QRO167J-332	RESISTOR	PT1	PT-352V	PHOTO TRANSISTOR
C95	QET61CM-476	E CAPACITOR	C163	QCS31HJ-820	CAPACITOR	R166	QRO167J-333	RESISTOR	A, VA1	PU49624-2	VARISTOR
C96	QFN31HK-103	M CAPACITOR	C164	QET61CM-476	E CAPACITOR	R167	QRO167J-102	RESISTOR	A, VA2	PU49624-2	VARISTOR
C97	QFN31HK-103	M CAPACITOR	C165	QCS31HJ-270	CAPACITOR	R168	QRO167J-151	RESISTOR			
C98	QCF31HP-223	CAPACITOR	C166	QFN41HK-103	M CAPACITOR	C166	QFN41HK-103	M CAPACITOR			
C99	QCF31HP-223	CAPACITOR	C167	QFN41HK-103	M CAPACITOR	C167	QFN41HK-103	M CAPACITOR			
C100	QET61CM-227	E CAPACITOR	C168	QFN41HK-103	M CAPACITOR	C168	QFN41HK-103	M CAPACITOR			
C101	QET61CM-476	E CAPACITOR	C169	QET61CM-476	E CAPACITOR	C169	QET61CM-476	E CAPACITOR			
C102	QET61CM-476	E CAPACITOR	C170	QCF31HP-223	CAPACITOR	C170	QCF31HP-223	CAPACITOR			
C103	QCF31HP-223	CAPACITOR	C171	PU48530-221K	PEAKING COIL	EQ6	PGZ00148	EQUALIZER	A PWBB	PUS5110	LED PWB
C104	QET61CM-107	E CAPACITOR	C172	PU48530-221K	PEAKING COIL	L30	PU48530-221K	PEAKING COIL	D1	GL-450V	LE DIODE
C105	QET61HM-105	E CAPACITOR	C173	PU48530-221K	PEAKING COIL				HD1	PQ30101A	LED HOLDER
C106	QET61HM-106	E CAPACITOR	C174	PU48530-680K	PEAKING COIL						
C107	QET61HM-106	E CAPACITOR	C175	PU48530-221K	PEAKING COIL						
C108	QCF31HP-223	CAPACITOR	C176	PU48530-221K	PEAKING COIL						
C109	QET61CM-107	E CAPACITOR	C177	PU48530-221K	PEAKING COIL						
C110	QCS31HJ-350	CAPACITOR	C178	PU48530-221K	PEAKING COIL						
C111	QET41CM-476	E CAPACITOR	C179	PU48530-221K	PEAKING COIL						
C112	QCF31HP-223	CAPACITOR	C180	PU48530-221K	PEAKING COIL						
C113	QET61CM-107	E CAPACITOR	C181	PU48530-221K	PEAKING COIL						
C114	QET60JM-228	E CAPACITOR	C182	PU48530-221K	PEAKING COIL						
C115	QCF31HP-223	CAPACITOR	C183	PU48530-221K	PEAKING COIL						
C116	QCF31HP-223	CAPACITOR	C184	PU48530-221K	PEAKING COIL						

#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION	#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION	#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION
***** 8.2.15 JUNCTION CIRCUIT BOARD ASSEMBLY <16> *****											
PWBA	PGE20029B-01	JUN.PWB ASS'Y		R8	QRD167J-104	RESISTOR		IC18	UPC356C	IC	
D1	ISS133	DIODE		R10	QRD167J-222	RESISTOR		Q9	2SD636R.S	TRANSISTOR	R100
R1	QRD167J-101	RESISTOR		R11	QRD167J-222	RESISTOR		Q10	2SB751Q	TRANSISTOR	QRD161J-103
R2	QRD167J-101	RESISTOR		R12	QRD167J-222	RESISTOR		Q11	2SD636R.S	TRANSISTOR	QRD161J-562
R3	QRD167J-101	RESISTOR		R13	QRD167J-104	RESISTOR		Q14	2SD636R.S	TRANSISTOR	QRD161J-223
R4	QRD167J-101	RESISTOR		R14	QRD167J-104	RESISTOR		Q15	2SB751Q	TRANSISTOR	QRD161J-223
R5	QRD167J-101	RESISTOR		R15	QRD167J-104	RESISTOR		Q16	2SD636R.S	TRANSISTOR	QRD161J-104
R6	QRD167J-101	RESISTOR		R16	QRD167J-103	RESISTOR		Q22	2SD837Q	TRANSISTOR	QRD161J-473
C1	QET41CM-227	E CAPACITOR		R17	QRD167J-102	RESISTOR		Q23	2SD837Q	TRANSISTOR	QRD161J-104
C2	QET41CM-227	E CAPACITOR		R18	QRD167J-104	RESISTOR		Q31	2SD636R.S	TRANSISTOR	QRD161J-103
Δ VA1	PU49624-2	VARISTOR, (1-14)		R19	QRD167J-103	RESISTOR		Q32	2SB641R.S	TRANSISTOR	QRD161J-103
CN1	PU43351-8Y	CAP HOUSING		R20	QRD167J-104	RESISTOR		Δ D4	U05E	DIODE	QRD161J-103
CN2	PU43351-2Y	CAP HOUSING		RY1	PU56539	DC RELAY		Δ D6	U05E	DIODE	QRD161J-103
CN3	PU43351-2Y	CAP HOUSING		Δ VA1	PU49624-2	VARISTOR		D11	ISS133	DIODE	QRD187J-103
CN4	PU43351-10	CAP HOUSING		Δ VA2	PU49624-2	VARISTOR		D12	ISS133	DIODE	QRD161J-103
CN5	PU43351-4	CAP HOUSING		Δ VA3	PU49624-2	VARISTOR		D13	ISS133	DIODE	QRD161J-392
CN6	PU43351-2R	CAP HOUSING		Δ VA4	PU49624-2	VARISTOR		D14	ISS133	DIODE	QRD161J-472
CN7	PU43351-2	CAP HOUSING		CN1	PU43351-2Y	CAP HOUSING		R22	QRD161J-103	RESISTOR	QRD187J-72
CN8	PU43351-9	CAP HOUSING		CN2	PU43351-2R	CAP HOUSING		R28	QRD161J-472	RESISTOR	QRD161J-102
CN9	PU43351-8R	CAP HOUSING		CN3	PU43351-2	CAP HOUSING		R29	QVP640B-102	V RESISTOR	QVP640B-102
CN10	PU43351-10	CAP HOUSING		CN4	PU43351-11	CAP HOUSING		R30	QRD161J-682	RESISTOR	QRD161J-682
CN11	PU43351-8	CAP HOUSING		CN5	PU43351-3	CAP HOUSING		R31	QRD161J-392	RESISTOR	QRD161J-272
				CN6	PU43351-3Y	CAP HOUSING		R32	QVP640B-102	V RESISTOR	QVP640B-102
				CN7	PU43351-3R	CAP HOUSING		R33	QRD161J-472	RESISTOR	QRD161J-392
***** 8.2.16 SERIAL CODE CIRCUIT BOARD ASSEMBLY <17> *****											
***** 8.2.17 CASSETTE HOUSING CIRCUIT BOARD <18> *****											
PWBA	PGE30020A-2	SER CODE ASS'Y		Δ PWBB	PGE40002	CASSETTE HOUSING PWB		R34	QRD161J-223	RESISTOR	QRD161J-822
IC1	M50117AP	IC		PT1	PT-352V	PHOTO TRANSISTOR		R35	QRD161J-224	RESISTOR	QRD161J-333
IC2	TC4028BP	IC		CN1	PU43351-110	CAP HOUSING		R36	QRD161J-473	RESISTOR	QRD161J-R475
IC3	HD16021B	IC						R37	QRD161J-392	RESISTOR	QRD161J-223
IC4	TC4021BP	IC						R38	QRD161J-223	RESISTOR	QRD161J-681
IC5	OR UPD4021BC	IC						R39	QRD161J-103	RESISTOR	R161
IC6	M54519P	IC						R40	QRD161J-103	RESISTOR	QRD161J-224
IC7	TC4069UBP	IC						R41	QRD161J-103	RESISTOR	QRD161J-222
IC8	TC4584BP	IC						R42	QRD161J-103	RESISTOR	QRD161J-102
								R43	QRD161J-103	RESISTOR	QRD161J-102
								R44	QRD161J-103	RESISTOR	QRD161J-103
								R45	QRD161J-103	RESISTOR	QRD161J-103
***** 8.2.18 REEL SERVO CIRCUIT BOARD ASSEMBLY <20> *****											
Q1	DTA124EF	TRANSISTOR		PWBA	PGE20040A-2	REEL SERVO ASSY		R46	QRD161J-103	RESISTOR	QRD161J-224
Q3	DTCL24EF	TRANSISTOR						R47	QRD161J-103	RESISTOR	QRD161J-154
Q4	DTA124EF	TRANSISTOR						R48	QRD161J-103	RESISTOR	QRD161J-393
Q5	DTA124EF	TRANSISTOR						R49	QRD161J-103	RESISTOR	QRD161J-104
D1	V03C	DIODE		IC2	TC4066BP	IC		R50	QRD161J-103	RESISTOR	QRD161J-104
D2	ISS133	DIODE		IC3	TC4071BP	IC		R51	QRD161J-103	RESISTOR	QRD161J-104
D3	ISS133	DIODE		IC4	TC4069UBP	IC		R52	QRD161J-103	RESISTOR	QRD161J-104
R1	QRD167J-102	RESISTOR		IC5	HA1755PS	IC		R53	QRD161J-103	RESISTOR	QRD161J-103
R2	QRD167J-103	RESISTOR		Δ IC7	MS1207L	IC		R54	QRD161J-103	RESISTOR	QRD161J-102
R3	QRD167J-103	RESISTOR		IC8	UPC324C	IC		R55	QRD161J-103	RESISTOR	QRD161J-102
R4	QRD167J-542	RESISTOR		IC9	TC4066BP	IC		R56	QRD161J-103	RESISTOR	QRD161J-224
R5	QRD167J-104	RESISTOR						R57	QRD161J-103	RESISTOR	QRD161J-103
R6	QRD167J-104	RESISTOR						R58	QRD161J-103	RESISTOR	QRD161J-103
R7	QRD167J-103	RESISTOR						R59	QRD161J-103	RESISTOR	QRD161J-103
								R60	QRD161J-103	RESISTOR	QRD161J-103
								R61	QRD161J-224	RESISTOR	QRD161J-104
								R62	QRD161J-103	RESISTOR	QRD161J-104
								R63	QRD161J-103	RESISTOR	QRD161J-104
								R64	QRD161J-103	RESISTOR	QRD161J-104
								R65	QRD161J-562	RESISTOR	QRD161J-104
								R66	QRD161J-223	RESISTOR	QRD161J-104
								R67	QRD167J-223	RESISTOR	QRD161J-104
								R68	QRD161J-104	RESISTOR	QRD161J-104
								R69	QRD161J-473	RESISTOR	QRD161J-104
								R70	QRD161J-104	RESISTOR	QRD161J-104
								R71	QRD161J-103	RESISTOR	QRD161J-104
								R72	QVP640B-102	V RESISTOR	QVP640B-102
								R73	QRD161J-122	RESISTOR	QRD161J-184
								R74	QRD161J-103	RESISTOR	QRD161J-102
								R75	QRD161J-104	RESISTOR	QRD161J-104
								R76	QRD161J-103	RESISTOR	QRD161J-103
								R77	QRD161J-103	RESISTOR	QRD161J-103
								R78	QRD161J-103	RESISTOR	QRD161J-103
								R79	QRD161J-103	RESISTOR	QRD161J-103
								R80	QRD161J-103	RESISTOR	QRD161J-103
								R81	QRD161J-103	RESISTOR	QRD161J-103
								R82	QRD161J-103	RESISTOR	QRD161J-103
								R83	QRD161J-103	RESISTOR	QRD161J-103
								R84	QRD161J-103	RESISTOR	QRD161J-103
								R85	QRD161J-103	RESISTOR	QRD161J-103
								R86	QRD161J-103	RESISTOR	QRD161J-103
								R87	QRD161J-103	RESISTOR	QRD161J-103
								R88	QRD161J-224	RESISTOR	QRD161J-224
								R89	QRD161J-154	RESISTOR	QRD161J-154
								R90	QRD161J-393	RESISTOR	QRD161J-393
								R91	QRD161J-104	RESISTOR	QRD161J-104
								R92	QRD161J-223	RESISTOR	QRD161J-223
								R93	QRD161J-103	RESISTOR	QRD161J-103
								R94	QRD161J-103	RESISTOR	QRD161J-103
								R95	QRD161J-394	RESISTOR	QRD161J-394
								R96	QRD161J-105	RESISTOR	QRD161J-105
								R97	QRD161J-103	RESISTOR	QRD161J-106
								R98	QRD161J-103	RESISTOR	QRD161J-106
								R99	QRD161J-103	RESISTOR	QRD161J-106
								RA1	EXB-P85224M	RESISTOR ARRAY	
								RA2	EXB-P85224M	RESISTOR ARRAY	
								C1	QET61CM-107	E CAPACITOR	
								C2	QCF31HP-103	CAPACITOR	
								C13	QET61CM-106	E CAPACITOR	
								C14	QET61CM-106	E CAPACITOR	
								C30	QCF11HP-103	CAPACITOR	

#REF NO.	PART NO.	PART NAME, DESCRIPTION	#REF NO.	PART NO.	PART NAME, DESCRIPTION	#REF NO.	PART NO.	PART NAME, DESCRIPTION	#REF NO.	PART NO.	PART NAME, DESCRIPTION
C31	QET61CM-107	E CAPACITOR	J201	PUS0715-6	FEMALE CONN	R20	QRD161J-221	RESISTOR	C12	QET61EM-475	E CAPACITOR
C32	QFN31HK-103	M CAPACITOR	J202	PUS0715-18	FEMALE CONN	R21	QRD161J-333	RESISTOR	C13	QCS31HK-101	CAPACITOR
C33	QFN31MK-122	M CAPACITOR	J203	PUS0715-16	FEMALE CONN	R22	QRD161J-223	RESISTOR	C14	QFN31HK-102	M CAPACITOR
C34	QFN31HK-273	M CAPACITOR	TP1	PU45908	TEST PIN, (4-7, 9-21)	R24	QRD161J-105	RESISTOR	C15	QET61CM-106	E CAPACITOR
C35	QCF11HP-103	CAPACITOR	CN100	PUS5375	TR.SPACER, X2	R25	QRD161J-105	RESISTOR	C16	QET61HM-225	E CAPACITOR
C36	QET41EM-107	E CAPACITOR	CN110	PUS2908	SERVO PMB STAY	R26	QRD161J-393	RESISTOR	C17	QCF31HP-103	CAPACITOR
C37	QCS31HK-580	CAPACITOR				R27	QRD161J-530	RESISTOR	C18	QEN61HM-105	NP E CAPACITOR
C38	QET41EM-107	E CAPACITOR				R28	QRD161J-473	RESISTOR	C19	QCF31HP-102	CAPACITOR
C40	QET41EM-477	E CAPACITOR				R29	QRD161J-473	RESISTOR	C20	QFN31HK-273	M CAPACITOR
C41	QCF11HP-223	CAPACITOR				R30	QRD161J-473	RESISTOR	C21	QEN61HM-474	E CAPACITOR
C42	QET61CM-106	E CAPACITOR				R31	QRD161J-473	RESISTOR	C22	QET61CM-476	E CAPACITOR
C43	QET61CM-106	E CAPACITOR				R32	QRD161J-473	RESISTOR	C23	QCF31HP-223	CAPACITOR
C51	QFN31HK-273	M CAPACITOR	PWBA	PGE20190B-02	D/C SERVO ASS'Y	R33	QRD161J-473	RESISTOR	C24	QET61CM-106	E CAPACITOR
C52	QCF11HP-103	CAPACITOR	IC1	M51490L	IC	R34	QRD161J-564	RESISTOR	C25	QET61CM-106	E CAPACITOR
C53	QET41EM-107	E CAPACITOR	IC2	M51796P	IC	R35	QRD161J-105	RESISTOR	C26	QCS31HK-330	CAPACITOR
C55	QET41EM-107	E CAPACITOR	IC3	UPC324C	IC	R36	QRD161J-683	RESISTOR	C27	QFN31HK-223	M CAPACITOR
C57	QET41EM-477	E CAPACITOR	IC4	VC2023A-1	IC	R37	QRD161J-473	RESISTOR	C29	QCXB1CN-472	CAPACITOR
C58	QCF31HP-223	CAPACITOR	IC5	TC4030BP	IC	R38	QRD161J-473	RESISTOR	C30	QFN31HK-473	M CAPACITOR
C59	QET61CM-106	E CAPACITOR	IC6	TC4024BP	IC	R40	QRD161J-333	RESISTOR			
C75	QET41CM-107	E CAPACITOR	IC7	M56448L	IC	R41	PUS5509-474	V RESISTOR	C31	QCXB1CN-472	CAPACITOR
C76	QCF31HP-103	CAPACITOR	IC9	VC2025	IC	R42	QRD161J-223	RESISTOR	C32	QFN31HK-473	M CAPACITOR
C77	QET61CM-106	E CAPACITOR	IC10	T78005AP	IC	R43	PUS5509-224	V RESISTOR	C35	QFN31HK-473	M CAPACITOR
C78	QET41CM-106	E CAPACITOR				R44	QRD161J-562	RESISTOR	C36	QFN31HK-473	M CAPACITOR
C79	QET61CM-106	E CAPACITOR				R45	QRD161J-104	RESISTOR	C37	QCXB1CN-472	CAPACITOR
C80	QET41CM-227	E CAPACITOR				R46	QRD161J-473	RESISTOR	C38	QCXB1CN-472	CAPACITOR
C81	QCF11HP-223	CAPACITOR	Q1	DTC144EF	TRANSISTOR	R48	QRD161J-103	RESISTOR	C39	QET61EM-475	E CAPACITOR
C82	QET41EM-227	E CAPACITOR	Q2	2SC1740S(QRS)	TRANSISTOR	R50	QRD161J-103	RESISTOR	C40	QET61EM-475	E CAPACITOR
C83	QCF11HP-223	CAPACITOR	Q3	2SA933S(RS)	TRANSISTOR	R51	QRD161J-272	RESISTOR	C41	QFN31HK-102	M CAPACITOR
C84	QET41EM-106	E CAPACITOR	Q4	2SC1740S(QRS)	TRANSISTOR	R52	QRD161J-102	RESISTOR	C42	QFM41HJ-682M	M CAPACITOR
C85	QET41EM-106	E CAPACITOR	Q5	2SA933S(RS)	TRANSISTOR	R53	QRD161J-103	RESISTOR	C43	QFM41HJ-683M	M CAPACITOR
C86	QET41CM-107	E CAPACITOR	Q6	DTC114EF	TRANSISTOR	R54	QRD161J-333	RESISTOR	C44	QCF31HP-223	CAPACITOR
C92	QFN41HK-102	M CAPACITOR	Q7	DTC114EF	TRANSISTOR	R55	QRD161J-472	RESISTOR	C45	QET61CM-473	E CAPACITOR
C93	QFN41HK-102	M CAPACITOR	Q8	DTC114EF	TRANSISTOR	R56	QRD161J-104	RESISTOR	C46	QFN31HK-152	M CAPACITOR
C97	QET61CM-107	E CAPACITOR	Q9	2SD973AR	TRANSISTOR	R57	QRD161J-104	RESISTOR	C47	QET61CM-476	E CAPACITOR
C98	QCF31HP-103	CAPACITOR	Q10	DTC144EF	TRANSISTOR	R58	QRD161J-105	RESISTOR	C48	QET61CM-476	E CAPACITOR
C100	QFN31HK-103	M CAPACITOR				R59	QRD161J-104	RESISTOR	C49	QCF31HP-223	CAPACITOR
C101	QCF31HP-103	CAPACITOR				R60	QRD161J-104	RESISTOR	C50	QCF31HP-102	CAPACITOR
C102	QET61EM-476	E CAPACITOR							C51	QFN31HK-223	M CAPACITOR
C103	QFN31HK-273	M CAPACITOR	D1	1SS133	DIODE	R61	QRD161J-564	RESISTOR	C52	QCS31HK-271	CAPACITOR
C104	QFN31HK-104	M CAPACITOR	D2	1SS133	DIODE	R62	QRD161J-472	RESISTOR	C53	QFM41HJ-672M	M CAPACITOR
C105	QFN41HK-332	M CAPACITOR	D4	1SS133	DIODE	R63	QRD161J-121	RESISTOR	C54	QFN31HK-102	M CAPACITOR
Δ L1	PU48530-271K	PEAKING COIL	D5	1SS133	DIODE	R64	QRD161J-121	RESISTOR	C55	QFN31HK-103	M CAPACITOR
Δ L4	PU48530-271K	PEAKING COIL	D7	1SS133	DIODE	R65	QRD161J-121	RESISTOR	C56	QCS31HK-221	CAPACITOR
Δ L5	PU48530-271K	PEAKING COIL	D8	HZ55.6E81	ZENER DIODE	R66	QRD161J-121	RESISTOR	C57	QFN31HK-102	M CAPACITOR
Δ L6			R1	QRD161J-152	RESISTOR	R67	QRD161J-121	RESISTOR	C58	QFN31HK-104	M CAPACITOR
Δ L8	PU48530-271K	PEAKING COIL	R2	QRD161J-224	RESISTOR	R68	QRD161J-661	RESISTOR	C59	QFN31HK-106	M CAPACITOR
Δ L9	PU50755	CHOKE COIL	R3	QRD161J-104	RESISTOR	R70	QRD161J-224	RESISTOR	C60	QFN31HK-473	M CAPACITOR
Δ L13	PU48530-271K	PEAKING COIL	R4	QRD161J-102	RESISTOR	R71	QRD161J-473	RESISTOR	C61	QFN31HK-473	M CAPACITOR
Δ L14	PU48530-271K	PEAKING COIL	R5	QRD161J-331	RESISTOR	R72	QRD161J-103	RESISTOR	C62	QFN31HK-473	M CAPACITOR
Δ L15	PU50277	INDUCTOR	R6	QRD161J-686	RESISTOR	R74	QRD161J-223	RESISTOR	C63	QCF31HP-223	CAPACITOR
Δ L16	PU48530-271K	PEAKING COIL	R7	QRD161J-102	RESISTOR	R75	QRD161J-823	RESISTOR	C64	QET61CM-476	E CAPACITOR
Δ L17	PU48530-271K	PEAKING COIL	R8	QRD161J-103	RESISTOR	R76	QRD161J-563	RESISTOR	C65	QEN61EM-475	NP E CAPACITOR
			R9	QRD161J-564	RESISTOR	R77	QRD161J-224	RESISTOR	C66	QCF31HP-102	CAPACITOR
			R10	QRD161J-103	RESISTOR	R78	QRD161J-473	RESISTOR	C67	QET61CM-476	E CAPACITOR
HS1	PUS3644	S HEAT SINK (1)				R79	QRD161J-103	RESISTOR	C68	QCF31HP-223	CAPACITOR
HS2	PUS0718	S HEAT SINK (2)				R80	QRD161J-103	RESISTOR	C69	QET61AM-107	E CAPACITOR
SCW1	PU41624-6	ISOLAT.WASHER, X2	R11	QRD161J-105	RESISTOR	C1	QET61CM-476	E CAPACITOR	C70	QET61CM-476	E CAPACITOR
	GBST3006Z	TH.TAP.SCREW	R12	QRD161J-103	RESISTOR	C2	QCS31HK-151	CAPACITOR			
SCW2	DPSP3008Z	ASSY SCREW, X2	R13	QRD161J-103	RESISTOR	C3	QCF31HP-103	CAPACITOR	C71	QET61HM-105	E CAPACITOR
SCW3	GBST3006Z	TH.TAP.SCREW, X2	R14	QRD161J-103	RESISTOR	C4	QFN31HK-103	M CAPACITOR	C72	QET61HM-105	E CAPACITOR
SLD1	PU33642	SHIELD CASE	R15	QRD161J-153	RESISTOR	C5	QET61CM-227	E CAPACITOR	C74	QFN31HK-104	M CAPACITOR
			R16	QRD161J-105	RESISTOR	C6	QFV41HJ-476M	TF CAPACITOR	C75	QET61CM-106	E CAPACITOR
			R17	QRD161J-103	RESISTOR	C7	QET61CM-106	E CAPACITOR	C76	QCS31HK-101	CAPACITOR
			R18	QRD161J-104	RESISTOR	C8	QET61CM-106	E CAPACITOR	L1	PU48530-271J	PEAKING COIL
			R19	QRD161J-105	RESISTOR	C9	QET61CM-476	E CAPACITOR	L2	PU48530-271J	PEAKING COIL
						C10	QFN31HK-104	M CAPACITOR	L3	PU48530-271J	PEAKING COIL
						C11	QFN31HK-332	M CAPACITOR	L4	PU48530-271J	PEAKING COIL

